



Coeur d'Alene Lake Management Plan Addendum

EXECUTIVE SUMMARY December 23, 2002

Background

An extensive water quality study of Coeur d'Alene Lake was completed in 1991. Based upon a review of the results of that study, the Coeur d'Alene Lake Management Plan (the Plan) was developed in 1995 by the State of Idaho Division of Environmental Quality (DEQ), the Coeur d'Alene Tribe, and other state, local and federal governmental entities. Since the development of the Plan, our knowledge of the system has been refined, portions of the Plan have been implemented, and changes in legal and regulatory conditions, as well as remedial actions, have occurred, which impact the appropriateness, implementability and effectiveness of the Plan.

The Environmental Protection Agency (EPA), the State, and the Tribe have determined to manage metals contaminated sediments lying on the bottom of Coeur d'Alene Lake through effective nutrient management. This determination is supported in the Remedial Investigation/Feasibility Study (RI/FS).

To this end, a Review Committee consisting of the DEQ and the Tribe was formed in consultation with the counties to review and, by consensus, formulate and recommend appropriate modifications to the Plan to effectively implement the Plan. This addendum presents the recommended modifications.

Review Process

The review process included the following steps: 1) a meeting was convened among scientists who had collected new information on lake water quality and sediment/metals mobilization. The meetings purpose was to review new data to determine the current status of lake health and how best to manage metals in lake bed sediments; 2) a series of meetings were held with resource agencies who participated in development of the original Plan. These agencies provided updated information that was used to revise all the tables in the original Plan. Resource managers evaluated past and future funding needs to accomplish the tasks outlined in the Plan. These meetings were also attended by local citizens, county commissioners and interest groups; 3) DEQ and the Coeur d'Alene Tribe attended public meetings to discuss the progress of the Plan review process; 4) a review of the Plan by the Basin Citizens' Advisory Committee (CAC) was also conducted and submitted to the State and Tribe and was used as part of the review process; 5) discussions were held among Coeur d'Alene Basin Commission members as to the adoption of the Plan as part of the Commission's work plan, and 6) DEQ, Tribe, and USGS collaborated on the development of the water quality status portion of this Addendum to the original Plan.

Attempts were made to contact and seek the involvement of participants in the 1995 lake planning effort. In addition, persons expressing interest in the review and revision effort were included in the list of contacts and were invited to participate in the process of reviewing Management Action Tables. Industry, elected officials, agency representatives, land owners and interest groups all participated in the workgroup sessions. Six workgroups were organized, that include: Agriculture, Forestry, Roads/Development, Wastewater/Stormwater, Rivers, and Southern Lake. Lists of participants for each workgroup are included as an attachment to the Addendum.

Prior to the meetings, phone contact was made with stakeholders. Action Item tables were sent out to participants. Participants were requested to review the tables and be prepared to discuss additions and revisions to the tables. Agency land managers were also asked to provide information on past, current, and future funding sources committed to conduct specified activities.

During the meetings the Action Item tables were thoroughly reviewed action by action, and revised as necessary incorporating information presented. In some cases disagreement on certain issues existed. When this occurred changes to the tables were not made, but instead a brief narrative explaining the differing points of view are summarized as part of this addendum.

Preliminary Findings

- 1) General monitoring results indicate that water quality of the Lake remains good for nutrients, clarity and dissolved oxygen: a) dissolved oxygen generally meets State and Tribal standards, except in the southern one-third of the Lake; b) dissolved zinc exceeds the State, Tribal, and federal water quality standards by two fold; c) lead concentrations have exceeded drinking water standards during extreme high flows; d) lake bed sediments pore water studies suggest that metals continue to flux into and out of solution within the sediment and in the water immediately overlying the sediment; and e) zinc concentrations suppress algae production in the Lake.
- 2) Results of recent water quality monitoring show the need to fully implement the Plan as the way to effectively contain and prevent the mobilization of metals from lake bed sediments to the water column.
- 3) Some of the Action Items outlined in the old Plan have been implemented, however, many other actions outlined in the Plan were voluntary and not implemented.
- 4) There is no universal long-term priority to fund many Action Items.
- 5) There is no organized coordination to implement the Plan.
- 6) There is no organized comprehensive lake water quality monitoring program in place to adequately track lake water quality trends.

7) Action Items outlined in the revised tables should continue to be implemented. This will entail having these Action Items to be considered a priority to land managers.

8) A list which identifies specific restoration projects to reduce sediment should be developed. This list would serve as the basis for developing yearly prioritization and funding proposals.

9) Funding sources must be identified and secured to assure the restoration project list and Action Items identified in the tables of the Plan will be conducted.

10) The monitoring plan presented in the addendum should be funded during the life of the EPA clean up. In the event of a reversal in the trend toward water quality improvement, i.e. trend toward decline in water quality, a series of key water quality indicator thresholds or trigger levels should be established upon which more aggressive management action could be taken.

11) Staff should be hired to oversee the implementation of the Plan.

12) The Plan should be endorsed and formerly adopted by the Basin Commission and be used to develop the Basin-wide work plan which will be implemented over the next 30 years. Yearly funding Proposals developed by the Commission should include LMP implementation.



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SECTION 1: INTRODUCTION

The original development of the Lake Management study was initiated in 1991 in response to long-term concerns over water quality degradation in Coeur d'Alene Lake. These concerns centered around the increases in nutrients which resulted in increased Plant growth, decreases in water clarity, and heavy metals contamination found in lakebed sediments. The study had three objectives:

- 1) Determine the Lake's ability to receive and process nutrients (phosphorous and nitrogen) in order to devise measures that will prevent declines in water quality degradation.
- 2) Determine the potential for releases of heavy metals from lake bed sediments into the overlying lake water; and
- 3) Develop information to support a Lake Management Plan that will identify actions needed to meet water quality goals.

Upon completion of the study, a Lake Management Plan (the Plan) was developed to address water quality and non-water quality issues. The Plan was completed in 1995. Although the Plan was the most comprehensive evaluation of the lake water quality at that time, it did not fully evaluate recreational, aesthetic and use issues. Since that time, certain non-point source reduction activities outlined in the Plan have been conducted. A comprehensive review to determine the effectiveness of such implemented actions, however, has not occurred. In addition, several other key activities have occurred which warrant the review and revision of the Plan. These activities are as follows:

1) The United States Supreme Court decision in *Idaho v. United States*, 522U.S.262 (2001): that affirmed, *enter* ALIA, the Coeur d'Alene Tribe is the beneficial owner of the beds and banks of the southern one-third of the Coeur d'Alene Lake and a portion of the St. Joe River. The decision did not address ownership of the beds and banks lying within Heyburn State Park.

2) Additional studies and monitoring: The scientific data that were used for the Plan were collected in 1991. Since then, many additional studies have been conducted by State, Tribal, Federal and other natural resource based entities. Significant information includes, but is not limited to, that developed by:

a) The United States Geologic Survey (USGS) under contract with the United States Environmental Protection Agency. This work was conducted as part of EPA's basin wide Remedial Investigation/Feasibility Study (RI/FS). The studies focused on various aspects of metals mobilization into, within and out of the Lake. Work also focuses on the mobilization of metals in and out of the lake bed sediments.

b) The State of Idaho Department of Environmental Quality (DEQ). The State's primary data gathering efforts focused on monitoring lake water quality (nutrients, DO, temperature, and clarity). Another major effort of the State, EPA, and the Tribe is the development of Total Maximum Daily Loads (TMDLs) for those water bodies currently

on the Section 303(d) list. As required by Section 303(d) of the Clean Water Act, a list has been developed for those water bodies, which do not meet applicable water quality standards. For those 303(d) listed water bodies in the Coeur d'Alene Basin, TMDLs either have been or will be developed to reduce pollutant loads flowing into Coeur d'Alene Lake.

c) The Coeur d'Alene Tribe's water quality monitoring data, which were collected on the southern portion of the Lake. This effort was also focused on monitoring nutrient loading, DO, temperature, and water clarity.

d) Studies conducted as part of the Coeur d'Alene Basin Natural Resource Damage Assessment. This work focused on water quality and fisheries investigations; and

e) Additional studies conducted through universities. This work also focused on metals mobilization in lakebed sediments. A discussion of this new information can be found in Section 2 of this Addendum.

Since the effectiveness of the Plan's implementation can only be determined by collection of additional data, monitoring the status of the Lake will continue to be a priority. A comprehensive monitoring program has been developed as part of the Plan review and revision. This monitoring Plan was developed through a series of EPA sponsored workgroup sessions and is found in Section 4 of the Addendum.

3) Superfund Basin wide RI/FS: In 1996, a human health blood lead study was conducted by the State of Idaho. This study indicated that a significant percent of children tested in the Basin, outside the current 21 square mile Bunker Hill Superfund site had elevated blood lead concentrations. Data were also collected as part of the NRDA, which identified wide spread contamination throughout the basin as well as significant injury to land, water, fish, birds, and other biota. These studies, in part, provided information that led to continuing efforts to investigate and remediate contaminated portions of the Basin outside the scope of their two previous basin Records of Decision (RODs). EPA officially announced the initiation of the Basinwide RI/FS in 1998, which was completed in 2001. In September of 2002, the States of Idaho and Washington and the Coeur d'Alene Tribe provided the EPA with letters of concurrence for the ROD. The ROD was signed by EPA on September 12, 2002.

4) Creation of Coeur d'Alene Basin Commission: In 2001, the State of Idaho passed legislation creating a Commission to implement the Basinwide ROD. This was developed as part of House Bill # 256- Basin Environmental Improvement Act. The Commission is comprised of representatives from the States of Idaho and Washington, the Federal government represented by EPA, the Coeur d'Alene Tribe, and Kootenai, Shoshone, and Benewah Counties. A Memorandum of Agreement (MOA) has been signed by all participants engaged in this Commission, and operational protocols are currently being developed.

As defined within the MOA, the primary purpose and foundation of the Basin Commission's work will be to implement the 2002 ROD approved pursuant to the federal Comprehensive environmental Response, Compensation, and Liability Act of 1980, as

amended (CERCLA) to address heavy metal contamination in the Coeur d'Alene Basin. Future Records of Decision to address Coeur d'Alene Basin heavy metal contamination issued by EPA, with concurrence from the Idaho Department of Environmental Quality and the Coeur d'Alene Tribe as appropriated, may be incorporated into the Basin Commission's work. In addition, the Basin Commission may address the following: a) a Record of Decision implementing Phase II of the Bunker Hill Comprehensive Cleanup Plan consistent with the 1992 ROD, b) adoption and implementation/coordination of the Lake Management Plan to manage, enhance, preserve, and protect water quality; and c) remediation of heavy metal contamination at specific mining sites in the North Fork of the Coeur d'Alene River.

5) Basin wide 2002 Record of Decision (ROD): Due to the extensive occurrence of contamination throughout the Basin, EPA's new ROD contemplates additional remediation throughout the basin over the next 30 years. Activities Planned include: a) yard removals, public health education programs and other human health institutional controls; b) extensive stream-side tailing removals and bank stabilization projects; c) remediation of abandoned mill and mine sites; d) removal of contaminated sediments within certain high waterfowl use areas within the flood plains of the lower Coeur d'Alene River; e) riverine dredging; f) repository design and development; g) innovative technology development; and h) passive treatment of mine water discharge.

Remedial activities are not contemplated for Coeur d'Alene Lake pending the review of the Lake Management Plan. As stated in the ROD, upon further review of the Plan, the EPA, Tribe and State of Idaho will determine if actions outlined in the Plan have and will continue to be conducted to assure the Lake will be protected from accelerated nutrient loading. If the Plan is deemed adequate, the Lake will then be considered for official EPA deletion from the current Superfund designation. This decision will be the subject of a future ROD. The ROD will outline that no further CERCLA actions are being considered for the Lake. Instead, the Plan will be implemented and the future water conditions will be monitored to determine if the actions outlined in the Plan are protecting the Lake's water quality. It is anticipated that if water quality begins to deteriorate, additional actions will have to be taken to reverse a negative trend.

The governments believe the Plan is essential to manage metals contaminated sediments in Coeur d'Alene Lake. To this end, the governments are reviewing and updating the Plan.

The review process included the following steps: 1) a meeting was convened among scientists who had collected new data on lake water quality and sediment/metals mobilization; 2) a series of meetings were held among resource agencies outlined in the old Plan. These agencies were asked to provide updated information, which became the basis of the revision of all the Management Action tables in the old Plan. Resource managers were also asked to come prepared to discuss past and future funding needs to accomplish the tasks outlined in the tables of the Plan. These meetings were also attended by local citizens, county commissioners and interest groups; 3) the State of Idaho and the Tribe attended public meetings to discuss the progress of the Plan review

process; 4) a review of the Plan by the Basin Citizens Advisory Committee (CAC) was also conducted and submitted to the State and Tribe and was used as part of the review process; 5) discussions were held among Coeur d'Alene Basin Commission members as to the adoption of the Plan as part of the Commissions work Plan; and 6) the State, Tribe, and USGS, collaborated on the development of an Addendum (this document) to the original Plan.

The Addendum to the LMP has the following Sections:

Section 1: Introduction

Section 2: Summary of Coeur d'Alene Lake Water Quality Data

Section 3: Summary of Management Action Table Review

Section 4: Proposed Work Plan for Limnological Monitoring & Evaluation of Coeur d'Alene Lake

Section 5: Conclusions and Recommendations

SECTION 2: SUMMARY OF COEUR D'ALENE LAKE WATER QUALITY DATA

The Coeur d'Alene Lake Management Plan was approved in 1995. The Plan recognized four distinct zones for lake management: the deep northern pools and the shallow southern pool, backwater-affected sections of the Coeur d'Alene and St. Joe Rivers, and a shallow near shore zone of variable width which rings much of the Lake. The near shore zone can be quite broad in some shallow bays and quite narrow along steep lakeshore.

Water quality monitoring by various agencies and the Coeur d'Alene Tribe has continued in the Lake from 1995 through 2001. Dissolved oxygen, temperature, clarity, total phosphorus and the metals, cadmium, lead and zinc are the parameters that were most often assessed during this period. Water samples were primarily collected in the upper layer of the Lake to a depth where light intensity is 1% of that at the surface (euphotic zone). Measurements of dissolved oxygen and temperature were completed for full-depth profiles. These measurements were primarily made at three mid-lake stations in the northern pool of the Lake from July through October. Most bays were sampled once during August on a rotational basis. The Coeur d'Alene Tribe assessed the southern area of the Lake from 1999 through 2001. The U.S. Geologic Survey (USGS) completed more intensive water column monitoring from June through October 1999 as part of EPA's basin-wide remedial investigation. In addition, USGS conducted special studies of lakebed sediments and the lake water near the sediment-lake water interface to assess the mobility of metal bearing compounds between the sediment and the lake water.

In general, these monitoring results indicate that water quality in the Lake remains good for nutrients, clarity, and dissolved oxygen. Dissolved oxygen meets both State and Tribal standards except within the southern section of the Lake where exceedances are routinely recorded during the summer. Dissolved oxygen saturation declines to about 75% in the hypolimnion. Overall, dissolved zinc exceeded water quality standards by two fold. Monitoring results are better interpreted on the basis of the lake zone in which these were collected, as discussed below.

Northern Pool Water Quality Data

The mid-lake stations of the Lake's northern pool are representative of the conditions in the low nutrient (oligotrophic) deeper areas of the Lake. Average lake clarity increased approximately one meter during the seven years, peaking at an average of ten meters. However, clarity declined to 3 meters during the low discharge year of 2001. Average total phosphorous in the euphotic zone has varied from 5 to 7.5 ug/l with the lower values observed in the most recent years. Average dissolved zinc in the euphotic zone has declined from 92 ug/l to 57 ug/l (from approximately three times the standard to two times the standard). Lead exceeds water quality standards during flood (high discharge) events and total lead exceeded drinking water standards prior to filtration for an extended period during the exceptionally high discharges of 1996.

Dissolved oxygen concentration meets standards throughout the water column during those months when monitoring has been conducted, which are the same months when

dissolved oxygen at depth would be expected to be at the lowest concentration. Declines in oxygen concentrations have been observed at depth. The average decline in saturation was to 70% in the mid-1990s, while these averaged 80% by the end of the decade. The low discharge year of 2001 resulted in average dissolved oxygen to 52% of saturation. For comparison, Priest Lake exhibits oxygen declines to 75% of saturation during the summer months. Of all the big lakes in northern Idaho, Priest Lake is the lake that has suffered the fewest impacts from human activity.

Few measurements of chlorophyll-a have been made at the mid-lake stations. Chlorophyll-a, measured in the early 1990s, was in the range of 0.5ug/l, while measurements made in 1999 were in the range of 1 ug/l.

Near Shore Water Quality Data

Assessment of the near shore areas indicates that over half the bays had total phosphorus concentrations similar to that of the mid-lake stations (5 to 7.5 ug/l). Clarity was in the range of 7 to 10 meters. Total phosphorous concentration greater than 8 ug/l were measured in the waters of Wolf Lodge Bay and associated bays, Blue Creek and Squaw Bays. Clarity in these bays was in the range of 6 meters. The water quality of Kidd Island Bay has improved since the early and mid-1990s; showing a decline in and an increase in water clarity.

Southern Pool Water Quality Data

The Coeur d'Alene Tribe has monitored water quality in the shallow southern portion of the Lake since 1997. Prior to this, DEQ and the USGS monitored water quality. Monitoring results from the lower Lake (Harrison to Conkling Point) show total phosphorous concentrations of <5 to 23 ug/L and water clarity of 1 to 9 meters. Chlorophyll-a was in the range of <0.01 to 4.2 ug/L. Dissolved oxygen concentrations below tribal water quality standards were observed during the summer and early fall months with an associated decline in saturation to below 30% at depth. Total phosphorous (<5 to 88 ug/L) and chlorophyll-a (<0.01 to 12.4 ug/L) concentrations are higher in the impounded area of the St. Joe River and its lateral lakes (Round, Hidden and Chatcolet Lakes). Water clarity is lower than the northern 2/3 of the Lake during the summer months and dissolved oxygen is below tribal water quality standards at depth. Anoxic conditions do occur at depth during the summer months. The mesotrophic nature of the lower Lake and the eutrophic nature of the impounded river and its lateral lakes are possibly the result of the Post Falls impoundment as well as agricultural sediment and nutrient sources from adjacent tributaries and other identified pollution sources.

Lakebed Sediments Pore-Water Quality Data

Special investigations conducted by the USGS and University of Idaho (UI) indicate sediment pore water quality issues that require additional scrutiny. Sediment pore-water investigations conducted by the USGS (1998; 2000; 2002) and the UI indicate that the metal contaminated lake bottom sediments in the northern pool contribute some dissolved

nutrients, zinc and arsenic to the water column of the Lake by diffusion from the sediment pore water. Calculations of the estimated magnitude of this benthic flux reported in EPA's remedial investigation report were derived from measurements using a benthic flux chamber at two locations and lake diffusion-controlled samplers at several other locations. These investigations did not determine the fate and transport of the metals and nutrients after they were mobilized from the sediments into the Lake's water column. Annual mass balance calculations demonstrate that overall the Lake acts as a sink rather than a source of metals. However, during some winter months more dissolved zinc and inorganic nitrogen are exported than are input to the Lake. The data for water years 1999 and 2000 suggest that approximately 30% of the zinc and 90% of the lead entering the Lake from the Coeur d'Alene River remains in the lakebed. Although both the USGS and the U of I studies provided some valuable information, the issue of metals mobilization from lakebed sediments requires further attention considering the importance of this potential source of metals.

Metals Inflow Data

The migration and fate of inflow plumes through the northern pool of the Lake was assessed. Results for this single year event indicate that an inflow plume did move across the surface of the northern pool and was directly discharged to the Spokane River. These results require verification and documentation under a number of high and lower discharge scenarios. (Note: DEQ assessed temperature, dissolved oxygen, conductivity and turbidity profiles at Outlet, Tubb's Hill and Driftwood Point Stations at the peak discharge of the April 2002 event. The temperature data indicate, at most, a degree centigrade difference throughout the water column, which, DEQ concludes, is not supportive of the density difference mechanism advanced by USGS.)

Zinc Interference with Algal Growth Data

Data collected during 1991 and 1992 had been interpreted to indicate that dissolved zinc is selectively stripped from the surface water and carried in a detrital rain to the bottom waters. Such a process has been verified in certain European lakes through studies published in peer reviewed literature. This phenomenon has not been directly verified by data collected from the Lake.

Zinc interference with phosphorous uptake and growth of algae was demonstrated by early (1970s) University of Idaho and later (1992) USGS studies. These studies indicate that the interference persists down to about 20 ug/L dissolved zinc. A decrease of dissolved zinc concentration in the euphotic zone of the Lake to below 20 ug/L may then trigger greater algal growth. A level of dissolved zinc 12.7 ug/L below the current state standard would likely be required to completely remove the zinc interference.

Summary

All of these studies add to our body of knowledge concerning the Lake, yet they also raise questions that deserve additional inquiry. However, none of these scenarios are

expected to lead to substantial degradation in water quality of the Lake in a short period of time. Additional monitoring of the basic Lake parameters, together with scientific inquiry into these questions over the years, will further inform management decisions. These preliminary results do not negate nutrient management as the best approach, nor should they preclude modification and implementation of common sense management actions.

SECTION 3: SUMMARY OF MANAGEMENT ACTION TABLE REVIEW

The Review Process

In the summer of 2002, Tribal and State representatives convened a series of meetings to specifically review and revise, as necessary, the management action tables contained in the original Plan. Attempts were made to contact and involve those who had participated in the 1994 Lake Planning effort. In addition, persons expressing interest in the review and revision effort were included in the list of contacts and were invited to participate in the process. Industry, elected officials, agency representatives, landowners and interest groups all participated in the workgroup sessions. Workgroups included: agriculture, forestry, roads/development, wastewater/stormwater, rivers and the southern Lake. Lists of participants for each workgroup are included as an attachment to this Addendum.

Prior to the meetings, phone contact was made with stakeholders. Action Item tables from the original plan were sent out to participants. Participants were requested to review the tables and to be prepared to discuss additions and revisions to them. Agency land managers were also asked to provide information on past, current, and future funding sources committed to conduct specified activities.

During the meetings each Action Table (found at the end of this section) was thoroughly reviewed and revised as necessary to incorporate information presented. In an effort to provide the reader with the edits of the original tables, the newly revised table depict the following: a) original information appears normal; b) newly added text is found in bold; c) original text which was deleted is in strikeout format. In some cases, disagreement on certain issues existed. When this occurred changes to the tables were not made. Instead, a brief narrative that explains the differing view points was prepared.

After the first meetings, DEQ and Tribal staff revised the tables and sent them back out to the workgroup participants who expressed interest in the revision process, but were unable to attend the meetings. Based on the comments received, it was evident that enough disagreement existed among participants to reconvene the Agriculture and Forestry workgroups.

As a result of the workgroup sessions, Tribal and DEQ staff revised the action tables and developed a narrative description of unresolved issues raised during the workshop sessions. In addition, the need for a new table defining specific restoration projects was identified. This list has yet to be developed.

General Comments

The review of the management actions outlined in the tables of the original Plan revealed several key points:

1) Resource managers had varying opinions about the implementation done to date and what would be needed in the future. Based on comments received, managers believed

that each had been one was doing more than what is legally required to manage their respective resources.

2) Many of the action items require more resource management personnel to conduct the activities outlined in the tables. As a result, it was difficult to break out costs as presented in the current tables.

3) Representatives were unable to provide firm funding information on what has been spent over the last five years or what future funding is required. Most agencies obtain their funding on a yearly basis so there are no assurances that money will be available from year to year. As a result much of the funding information necessary to fill in the tables was not available.

4) Many of the action items are descriptions of Best Management Practices (BMPs) on how best to conduct activities that could affect the Lake. They do not outline specific projects that need to be implemented to address known sediment inputs.

5) Managing nutrients in the Lake will be a dynamic process that will continue to evolve. Resource managers and other stakeholders must view the original Plan and this Addendum, with its revised tables, as a work in progress. There must be a continual audit process in place to track the effectiveness of its implementation.

In general, workgroup participants were able to reach consensus on many of the proposed changes to the original tables. In an effort to provide more specific information related to each management action identified in the original Plan, several additional column headings were included in the tables of the revised tables. These column headings include: 1) other group (to help define additional groups working on this action yet are not considered the lead group); 2) action to date (to provide the status of implementation of the action); 3) currently available \$ (to provide available funding commitments); 4) funding difference (to define the funds needed in addition to what is currently available); and 5) comments (to provide further explanation of Action Item topics). Many of the Action Items did not need modification. However some tables were modified and summaries developed to reflect updated information presented by workgroup members. Where significant differences existed among workgroup members, the summaries below also provide the range of salient points of view raised during the review.

Discussion of Salient Issues Raised During Workgroups

Forestry Workgroup

Meeting participation was broad based and included representatives of private landowners, industry, and federal, state, and tribal resource managers. One of the major resource managers, Idaho Department of Lands (IDL) was not represented. Since IDL manages significant portions of land within the Coeur d'Alene watershed, future meetings will be necessary to discuss IDL's comments with the other workgroup participants.

Original Action Item #1 (see Table 22): Adopt minimum 30' Stream Protection Zone (SPZ) for all Coeur d'Alene Basin streams not capable of supporting significant fisheries (Class II).

Comments Received:

1) More stringent requirement: It was proposed that more stringent standards be set for the protection of stream corridors. Proponents of this position suggested the use of INFISH guidelines; 300' SPZ Class I, 100' SPZ Class II perennial, 50' SPZ Class II intermittent. No entry into class I SPZ.

2) Work within the current law. Several representatives of Industry, the United States Forest Service (USFS) and private landowners believed that the Forest Practices Act (FPA) provided sufficient standards for conducting activities within stream corridors.

Some of the agencies represented currently adhere to INFISH guidelines, but did not want to be committed to this policy. Furthermore, it was suggested that an increase of SPZ to INFISH limits on all basin lands has no basis in science, and has not been proven to protect better than IFPA requirements.

Revision made to the Table:

Since viewpoints differed, it was difficult to develop changes to the Action Item that could be agreed upon. As a result, the original Action Item was modified to better capture the intent of the language in the original table. The revision is as follows: "Continued implementation of Forest Practices Act (FPA), Best Management Practices (BMPs) as related to stream protection zone (SPZ). Make recommendations as needed to FPA as related to SPZ." This does not resolve the issue but provides a record that potential additional BMPs to consider for SZP include INFISH standards. This issue will need to be revisited as new information is collected during the monitoring efforts proposed as part of the Plan.

Original Action Item # 5: "Add one additional full time FPA administrator in the basin to IDL staff, to inspect forest practices and enforce the FPA rules and regulations." This Action Item was expanded to add the Tribe as manager within their respective jurisdiction. It was also recommended that an interagency audit should be included as part of item #5. Since audits play such a critical role in adaptive management, the workgroup decided to create a new management action #6.

Original Action Item # 7: "Adopt Idaho FPA proposed 'Cumulative Watershed Effects' (CWE) process and implement it. Train public and operators in its use."

Comments Received:

1) The State's CWE process does not factor in rain-on-snow events. This CWE process should not be used.

- 2) The CWE process is being implemented on several watersheds in the Basin in response to the TMDL. This system is working.
- 3) The CWE process should be reviewed for its adequacy.
- 4) Rather than continue to disagree on a process, the best way to address non-point source pollution is to identify, prioritize and implement restoration projects.

Revision made to Table:

The original language has been revised as follows: "Identify, prioritize and implement restoration projects using currently available technologies." This change attempts to be inclusive to suggest that there are many ways to assess the problem (CWE being one of them). More importantly, "on the ground" projects which will reduce/eliminate non-point sources of pollution should be a more important consideration. The result of this discussion has led the State and Tribe to believe that a list of projects is indeed necessary. This list could be the basis to develop a yearly work-Plan to be implemented by the Commission in concert with the ROD.

Original Action Item #9: "Secure necessary funding to meet present and future maintenance needs on forest roads."

Comments Received:

- 1) Create a priority list of road maintenance needs and pursue funding. Use appropriate predictive modeling to pinpoint problem areas. This approach is preferred over greater restrictions on developing new roads.
- 2) Concern exists that private landowners are out of compliance and that before any new roads are built, old ones must fulfill FPA requirements.
- 3) Do not use funds obtained from logging in one area to fix problems in other areas.

Revision made to Table:

The original language has been revised as follows: "Secure necessary funding to meet present and future management objectives that reduce sediment on forest roads." This suggests that if more funds were available, roads within the forests would be better managed. Over time, this could prove to be a more feasible alternative than stopping all new road development.

Several other Action Items were suggested and include the following:

- 1) Establish conservation reserves in basin headwaters with the goal of maximizing water management objectives for the long-term benefit of Coeur d'Alene Lake.

This position was met with opposition. Those opposed suggested that there is no cost-benefit analysis to suggest that this approach could work better than spending the money on specific projects. Furthermore, improvements in lake water quality may suggest that the ongoing practices are working to protect the Lake's water quality.

2) Amend IPNF Forest Plan to establish more significant reductions of sediment, metals and nutrient loads entering Coeur d'Alene Lake as a #1 priority in the Basin.

Workgroup members opposed to this position suggest the following: a) current BMPs are adequate, if implemented, and b) to amend the IPNF Plan will require significant time and resources that would be better spent on the ground.

3) Place a moratorium on commercial logging in the upper watershed of the North Fork Coeur d'Alene River for a decade pending watershed studies and data that demonstrates impacts of floods (intensity, duration, and frequency), on metals, nutrients and sediment loads entering the Lake.

Proponents of this idea cite the North Fork as one of the most "roaded" forests in the country. Forestry practices have also been considered to contribute to the watershed's instability. Data indicate that the N.F. Coeur d'Alene River watershed is a major contributor to sediments into the Lake.

Those opposed to such a restriction suggest that: a) logging can help reduce the risk of fire and disease that can greatly destabilize a watershed; and b) current data suggests water quality is improving. Until there is a direct correlation that forest practices are causing water quality declines, why make this type of change?

The above noted differences among workgroup participants make it clear that continued discussions are necessary and that it is envisioned that this workgroup should continue to meet during implementation of the LMP (Lake Management Plan). Furthermore, any concepts discussed that were controversial are not being advocated here, but instead, presented as "potential tools" available to resource managers. A process must be established to continue these forestry management discussions.

Agriculture Workgroup

After reviewing the purpose and goal and the management actions for agriculture (Table 23(a)) from the 1995 Plan, the workgroup edited agency name changes, i.e., NRCS (Natural Resource Conservation Service) in place of SCS (Soil Conservation Service) SWCD (Soil and Water Conservation District) in place of SCD (Soil Conservation District), etc. The State Agriculture Water Quality Program (SAWQP) has been replaced by the Water Quality Program for Agriculture (WQPA) as the State's primary funding source for best management practices (BMPs). The Agriculture Pollution Abatement Plan continues to be the mechanism for implementing agricultural BMPs in Idaho. The program is voluntary and the key to its success is an effective information and education program coupled with strong technical and financial assistance to agricultural operators. Also discussed was the need to establish an inventory of land uses, including agricultural uses around the Lake and to create a database of funded BMP projects. The workgroup identified the need for additional staff for the various agricultural agencies to fully implement their portion of the Plan. The Kootenai/Shoshone Soil and Water Conservation District has proposed alternative management actions (Table 23(b)).

Stormwater Workgroup

After review of the goal statement and management actions (Table 24), it was acknowledged that Kootenai County has a site disturbance ordinance and has adopted the DEQ Stormwater BMP manual. Other counties need to do the same to reduce sediment and nutrients from land-disturbing activities. Northern Kootenai County will need to comply with EPA's new NPDES stormwater permit requirements. The City of Coeur d'Alene has formed a Stormwater Citizens' Advisory Committee. Inspections will be a part of the Stormwater Planning effort within the City of Coeur d'Alene. Funding is needed to effectively operate a Stormwater program. The concept of pollution trading was acknowledged and discussed. The workgroup decided that it was not needed at this time; however, this process could be used for future projects to protect lake water quality.

Roads Workgroup

Management actions and the goal statement were reviewed and revised (Table 25) to clarify the intent to reduce sediment and phosphorus from roads. Idaho Department of Transportation did not participate in the Workgroup meeting. However, local highway districts representatives expressed interest in identifying priority road restoration projects, but need technical and financial assistance to do so. The workgroup also recommended that Idaho Transportation Department take on a leadership role in addressing road improvement and restoration in the basin to ensure water quality protection.

Wastewater Workgroup

A 1995 Action Item recommended that a TMDL be developed to reduce the nutrients (Table 26). However, it has been determined that a TMDL is not needed since the Lake is not 303 (d) listed for nutrients. The Silver Valley wastewater treatment Plants are working to identify funding sources for treating infiltration and inflow sources.

South Lake Workgroup

During the review of the original table (Table 29), it was determined that far more management activities occur which affect the southern Lake than were depicted. It was also recognized that many of the management actions that manage nutrient input into the Lake and affect the southern Lake are found among other workgroup tables. As a result, the group decided not to edit the table and add all action items found in the other tables, but rather seek to add actions items specific to the southern portion of the Lake.

Additional actions added to the table include: 1) evaluate lake level fluctuation and management; 2) secure riparian zone management; 3) develop riparian buffer strips; and 4) develop and implement sediment, nutrient TMDLs.

Rivers Workgroup

This group met once to review Table 30. This meeting was well attended by agency staff, environmental groups, industry and the public. One of the main topics of the discussion focused on riverbank stabilization techniques. It was mentioned that certain techniques have been proven to work, but the workgroup hoped that the technology could advance to the point where a suite of technologies existed to address bank instability. Workgroup members felt that simply "armoring" banks was not adequate. This approach helps out local landowners who are losing their land to river erosion, but does not address the overall "big picture" which is reduction of nutrients into the Lake. It was also suggested that since there has not been a comprehensive study to determine which contributes more sediment (the banks or the bed) to the Lake, it is difficult to endorse bank stabilization without this information. Finally it was also mentioned that an evaluation of lake level management should be considered as an approach to increase river stability.

The State also identified management activities in Priest Lake, which could potentially be implemented on Coeur d'Alene Lake. This table is included as Table 31.

The Public Process

The State and the Coeur d'Alene Tribe believe it is important to provide the public with a review process to evaluate the revision to the Plan. The process that has been developed includes the following steps:

- 1) Invite the private and public sector to participate in the workgroups developed to review the Action Item tables. (Ongoing)
- 2) Meet with organized public groups to discuss the revision process and to provide updates on preliminary findings. Some of the meetings attended by State and Tribal staff include: a) the Coeur d'Alene Tribe's Lake Board; b) Washington State's Citizen Advisory Committee (CAC); c) the Coeur d'Alene Basin Commission; d) The Coeur d'Alene Basin CAC; e) Tribal Council, f) CLEAN, g) County Commissioners; and h) the Panhandle Basin Advisory Groups (BAGs).
- 3) Develop a draft revision of the Plan (this Addendum).
- 4) Once the revision has been developed a second phase of review will occur. This would entail distribution of the revision to a wider group of Stakeholders. (Fall of 2002).
- 5) Provide the public with a formal review of the draft revision. (Winter 2002-2003)
- 6) Finalize the revision (Winter/Spring 2003).

Table 22. Management actions recommended by forest practices technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
Action 1: Adopt minimum 30' Stream Protection Zone (SPZ) for all Gd'A Basin streams not capable of supporting significant fisheries (Class II). Implement Continue implementation of Forest Practices Act (FPA), BMPs as related to steam protection zone (SPZ) and make recommendations as needed to FPA as related to SPZ	2 1	IDL	USFS, BLM, Tribe	Adopted FPA Rule 7-96 Implementation ongoing	IDL, private	Minimal	??	??
Action 2: Continue to Implement pre-operation inspection as set forth in FPA for-for-all proposed timber harvest and related road construction.	1	IDL	USFS, BLM Tribe	MOA Completed and operational Some implementation	IDL, USFS, BLM, Tribe	\$75,000/yr for Tribe; Others??	Tribe-0 Others-?	Tribe-\$75K
Action 3: Streamline stream alteration permit process; make application procedure less time-consuming and more user-friendly to foster compliance.	2	IWR	Tribe	DWR completed Tribe ongoing	IWR, Tribe	Minimal	Minimal	??
Action 4: Continue stream channel protection activities, Develop more prescriptive stream-crossing and stream alteration BMPs that provide a high level of water quality protection from road sediments. Promote more administration and/or enforcement of the Stream Alteration Act within the basin for crossing, alteration proposals.	2 1	IWR, IDL, Tribe		State—improved BMPs	IWR, IDL, Tribe	Minimal	Minimal	??
Action 5: Add one additional full time FPA administrator in the basin to IDL and Tribal staff to inspect forest practices and enforce the FPA and Tribal forest Management and water quality rules and regulations within respective jurisdictions	1	IDL, Tribe		IDL-one FTE added	Legislature, Tribe	\$60,000/yr \$75K-Tribe	0	\$75K
Action 6: Conduct interagency audits.	1	IDL, Tribe, USFS, BLM		Ongoing yet inadequate IDL- annual DEQ ¼ year	IDL, Tribe, USFS, BLM	??	??	??
Action 6:7: Implement intensive continuous Information and Education program for forestland owners, loggers, road contractors; having demonstration sites for state-of-the-art forest management—Continue logger accreditation for any operation in the basin.	3	IDL, U of I, C.E.S., Tribe			IDL, Forest Industry Tribe	\$20,000	0	\$20K

Table 22. Management actions recommended by forest practices technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
Action 7 8 : Adopt Idaho FPA proposed "Cumulative Watershed Effects" process and implement it. Train public and operators in its use. Identify, prioritize and implement restoration projects using currently available technologies.	1	IDL, Legislature <i>Tribe</i>		<i>Adopted but voluntary.</i>	<i>EPA CWA 319</i>	\$8,000—\$15000 per watershed <i>Substantial</i>	??	??
Action 8 9 : Minimize road construction impacts in basin by cooperating on joint access development to forest stands. <i>Streamline process to allow access on previously developed roads.</i>	3	All landowners, <i>IDL, USFS, Tribe</i>		<i>No significant progress.</i>	<i>IDL, USFS, Tribe</i>	<i>Minimal</i> <i>Tribe-75K/yr</i> <i>Others ??</i>	<i>0</i> <i>??</i>	<i>\$75K</i> <i>??</i>
Action 9 10 : Secure necessary funding to meet present and future maintenance needs <i>management objectives which reduce sediment</i> on forest roads.	2	Counties, USFS, BLM, Industrial Forestland Owners, <i>Tribe</i>		<i>No significant progress.</i>	USFS, BLM, IDL, Legislature, Industrial, Forestland Owners, <i>Tribe</i>	<i>Significant but no \$\$ cost ests.</i>	<i>Minimal</i>	<i>Significant</i>
Action 10: Encourage landowners to manage forestlands to minimize potential water quality impacts of high intensity wildfire while maintaining other resources.	3	All landowners						
<i>Action 11: Monitor watershed restoration projects to measure effectiveness of sediment and nutrient reduction and to measure project success and cost-effectiveness.</i>	<i>2</i>	<i>IDL, Tribe</i> <i>USFS, BLM</i>	<i>DEQ, Forest Industry</i>	<i>Minimal</i>	<i>DEQ, IDL</i> <i>Tribe</i> <i>USFS, BLM</i> <i>Forest Industry</i>	<i>Substantial and long-term</i>	??	??

Comments:

Action 1: See narrative section

Action 4: Educate land owners on stream protection.

Action 5: Reviewers believe inspection and enforcement critical to BMP success

Action 6: Accountability important.

Action 7: Educate land owners.

Action 8: Necessary to accomplish but difficult to analyze. Focused work needed

Action 11: Educate land owners.

Table 23(a). Management actions recommended by agriculture technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
Goal: Reduce non-point source pollution from agricultural lands by increasing the voluntary implementation of BMPs* on cropland, hayland, pasture and confined animal feeding areas in order to reduce the amount of sediment, nutrients, pesticides and bacteria reaching Coeur d'Alene Lake and its tributaries.								
Action 1: Continue to aggressively encourage voluntary implementation of BMPs through existing SCD, SCS and ASCS <i>SWCD, NRCS, & FSA and other</i> programs to fund BMPs.	1	SCD <i>SWCD, NRCS, Tribe</i>	<i>IDFG</i>		County, State	\$20K		
Action 2: <i>Identify and</i> focus attention on those tributaries, which produce high levels of nutrients, sediment, pesticides and bacteria from agricultural sources.	1	SCD <i>SWCD IDEQ, Tribe, EPA</i>			N. A.	N. A.		
Action 3: Encourage Soil Conservation Districts to apply for state Agricultural Water Quality Program planning and implementation grants on priority Stream Segments within the Coeur d'Alene Lake Basin. Coordinate with tribe on reservation lands. <i>Apply for WQPA Planning and Implementation grants at watershed scale.</i>	1	SCD <i>SWCD</i>			WQPA, <i>State & Farmer Match</i>	\$100K/Plan 1M/imp		
Action 4: Conduct a River Basin Study of the St. Joe River sponsored by the Benewah Soil <i>and Water</i> Conservation District and carried out by the USDA agencies.	1	SCD <i>SWCD</i>			USDA	\$225K		
Action 5: Make structural sediment and erosion control practices high priority for all current and future agriculture programs and projects which supply financial and/or technical assistance to agricultural producers. These practices should be tied to vegetation improvements, i.e., grassed waterways and riparian planting.	1	SCD			N.A.	N.A.		
Action 6 5: Continue existing cropland management practices through aggressive implementation of federal Farm Bill requirements and other programs.	1	SCD <i>NRCS, FSA</i>			N. A.	N. A.		
Action 7 6: Implement an aggressive information and education program within the basin to increase agricultural producers' and the general public's knowledge of the technical and financial assistance available for BMP installation and the benefits to the lake, the land and the producers when BMPs are installed and maintained. Included in the Information and Education program should be the demonstration of new technology and management practices. Encourage On Farm Testing.	1	GES, SCD <i>GBRP, FSA, SWCD, U of I Ext Serv, WQPA, CBC **</i>			GES, SCD, GBRP <i>U of I Ext Serv, WQPA, CBPC</i>	\$35K <i>\$200K</i>		
Action 8 7: Provide assistance to hobby farms <i>livestock/agricultural operations with livestock/agricultural management BMPs and financial incentive programs to small acreage farms and landowners</i> , which are impacting water quality. provide them with livestock BMPs.	1	GES, GBRP <i>U of I Ext Serv CBPC</i>			SCD	<i>SWCD</i>		

Table 23(a). Management actions recommended by agriculture technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
<i>Action 9 8: Provide technical and financial assistance to confined animal feeding operations to implement livestock BMPs. Identify operations near waterways.</i>	2	SCD SWCD			SCD SWCD			
<i>Action 9: Inventory baseline of land use around Coeur d'Alene Lake. Establish a GIS czar. Create a database of funded agricultural water projects.</i>			Tribe					
Action 10: Restore natural vegetation buffers along creeks and drainageways to minimize runoff from adjacent lands through education and/or seek tax incentives for placing in reserve.	1	SCD, SCS SWCD NRCS, County			County			
Action 11: Implement water quality monitoring to determine effectiveness of agricultural BMP installation and maintenance.	1	DEQ			WPCA	\$30K		
Action 12: Request that ASCS approve BEnewah County for participation in Integrated Crop Management program.	4	ASCS			ASCS ACP			
Action 12 12 Encourage zoning ordinances that preserve land for agricultural use.	2	County Local Govt			County Local Govt			
Action 14 13 Identify and provide technical and financial assistance for streambanks stabilization for streams in agricultural areas.	2	SCD Private, SWCD Tribe			ACP			

COMMENTS:

Action 4: River Basin Studies quantify the production of sediment and nutrients from land uses within the study area in order to identify potential remediation actions to reduce production of sediment and nutrients from erosional processes.

* As defined by the ~~SCS~~ ~~SCWD~~ Field Office Technical Guide and the Idaho Agricultural Pollution Abatement Plan.

***(the new Coeur d'Alene Basin Commission)*

Table 23(b). Management actions recommended by agricultural practices technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
1. Implement an outreach program directed at individual agricultural landowners including livestock operations. The program will utilize personal contact with the intention of encouraging voluntary planning and implementation of BMPs. Focus attention on those tributaries identified by DEQ/Tribe in action item 6.	1	SWCD	NRCS Tribe		?	\$60K/yr		
2. Provide direct technical assistance to agricultural landowners, including livestock operations, for planning and implementation of BMPs. Focus attention on those tributaries identified by DEQ/Tribe in action item 5.	1	SWCD	NRCS Tribe		?	\$60K/yr		
3. Provide engineering surveys and designs for structural BMP implementation. Focus attention on those tributaries identified by DEQ/Tribe in action item 6.	1	SWCD	NRCS Tribe		?	\$60K/yr		
4. Utilize existing programs to provide cost share funding to landowners including livestock operations for BMP implementation. These could include EQIP, WQPA, 319 and other programs. Focus attention on those tributaries identified by DEQ/Tribe in action item 5.	1	SWCD	NRCS Tribe		Federal, State & Farmer Match	\$100K/yr	\$100K/yr	
5. Acquire additional funding for agricultural BMP implementation including funds for small acreage farms.	1	SWCD	NRCS Tribe		EPA	\$1M/yr		
6. Identify those tributaries which produce high levels of nutrients, sediment, pesticides and bacteria from agricultural sources.	1	DEQ Tribe	NRCS Tribe					
7. Same as Action #4 No Changes By KSSWCD								
8. Insure the continued implementation of existing cropland management practices, including production of grass seed, through implementation of federal Farm Bill requirement.	1	NRCS	FSA USDA			\$70/yr	\$0	
9. Implement an information and education program to increase agricultural producers' and the general public's knowledge of the technical and financial assistance available for BMP installation and the benefits to the lake, the land and the producers when BMPs are installed and maintained. This will be accomplished through newspapers, newsletters, tours, brochures and other mass communication tools.	2	SWCD	NRCS Tribe FSA IDEQ CES CBPC U of I	?	\$150,000/yr	\$12,000/yr		
10. Conduct on farm testing of potential new BMP technologies.	2	SWCD	U of I CES NRCS	?	\$500,000	\$0		

Table 23(b). Management actions recommended by agricultural practices technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
11. Provide planning and implementation assistance to small acreage farms for BMPs. Focus attention on those tributaries identified by DEQ/Tribe in action item 6.	1	SWCD	NRCS Tribe CES CBPC	?	\$60K/yr	\$0		
12. Create a database of land use activities, including BMP implementation, within the basin.	3	Tribe DEQ	NRCS SWCD FSA					
13. Develop a tax incentive program to encourage agricultural landowners to restore natural vegetation buffers along creeks and drainage way to minimize runoff from adjacent lands.	1	County	NRCS SWCD					
14. Implement water quality monitoring to determine collective effectiveness of BMP installation and maintenance.	1	DEQ						
15. Implement zoning ordinances that limit the conversion of agricultural land to urban uses.	1	County Tribe						
16. Provide technical and financial assistance for streambank stabilization for streams in agricultural areas.	2	SWCD Tribe	NRCS			\$1M/yr		

*Item 8 in the DEQ draft was combined in actions items 1-5.

Table 24. Management actions recommended by the development and stormwater technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
Goal: Maintain current phosphorous export in most effective manner.								
<u>Existing Stormwater Runoff</u> Action 1: Provide information and technical assistance to businesses, recreationists, cities, agencies, property owners and the general public. a) Develop a "Master Gardener's" type program. b) Develop a homeowners kit with info about landscaping and other methods of reducing and treating stormwater. <i>Distribute homeowner's kit when site disturbance applications are made in Kootenai County. * Lake*A*Syst Program</i> c) Provide staff to conduct stormwater audits for businesses and property owners, <i>and support Stormwater Citizens' Advisory Committee formed in City of Coeur d'Alene. Inspections will likely be part of city stormwater plan.</i> d) Promote, <i>Develop a program to</i> promote, in conjunction with the University of Idaho Cooperative Extension, the use of "lake friendly" products, such as lawn fertilizer which does not contain phosphorous, and grass species which require less fertilizer. Inform <i>Develop a program to</i> inform the public on the effects of their actions, such as burning on the lakeshore and in roadside ditches, boat washing, etc.	+ 2	KC, SC, BC, DEQ			fees, EPA, \$319, storm water utility, State of Idaho, counties	variable		
<u>Stormwater Runoff from New Development</u> Action 2: Provide contractors, utility companies, <i>engineers, design professionals</i> and the public with information on stormwater management. a) Encourage companies such as Washington Water Power <i>Avista</i> to incorporate erosion control into the siting, installation, and maintenance of utilities. b) Provide information on the effects of burning construction debris on the lake shore, weeds in ditches along the road side, <i>and compliance with the Trade Waste Burning Rule.</i> Require permit applicants to pass a test on stormwater management concepts	+3	KC, SC, BC, DEQ			EPA, \$319 program Storm water utility, State of Idaho, counties	variable		

Table 24. Management actions recommended by the development and stormwater technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
<p>Action 3: Expand Improve enforcement existing stormwater treatment and erosion control requirements in the portions of Kootenai County which are in the Cd'A Lake Basin, to better prevent phosphorous and sediment loading from grading and development activities.</p> <p>a) Establish a stormwater ordinance requiring that development projects include a combination of stormwater treatment and pollution trading which will result in no net increase in phosphorous loading to Lake Coeur d'Alene. Expand Kootenai Counties BMP handbook to include other treatment options, in addition to swales. Identify phosphorous sources which might be reduced to offset increased phosphorous export from new development. Funding badly needed for technical assistance.</p> <p>b) Identify phosphorus sources which might be reduced to offset increased phosphorus export from new development <i>Improve enforcement of existing erosion control requirements, including maintenance requirements. Hire staff to enforce stormwater/erosion /grading ordinances.</i></p> <p>c) Establish an ordinance requiring that erosion from development related grading projects be controlled.</p> <p>d) Improve enforcement of existing erosion control requirements, including maintenance requirements. Hire staff to enforce stormwater/erosion/grading ordinances.</p> <p>e) c) Establish performance standards which will minimize the quantity of sediment leaving property boundaries. (For example, prohibit increases in sediment export, or if sediment export is allowed, limit it to identified numeric standards; require stabilization within 7-14 days of soil disturbance).</p> <p>f) d) Adopt a Health District regulation requiring erosion control during the installation of subsurface sewage disposal systems.</p> <p>g) Explore funding options for stormwater and erosion control programs, including a stormwater utility.</p>	<p>1</p> <p>1</p> <p>1</p> <p>2</p> <p>3</p> <p>1</p>	<p>KC, Cities in KC, DEQ, CT</p> <p>DEQ, PHD, USFS, KC, Highway Dist</p> <p>KC, Cities in KC, CT</p> <p>KC, Cities in KC, DEQ, PHD, CT</p> <p>PHD</p> <p>KC, DEQ, PHD</p>	<p>See notes</p>		<p>EPA §319, and §104.B3, storm water utility, fees, State of Idaho, Counties</p>			
<p>Action 4: Implement stormwater and erosion control programs throughout the remainder of the Cd'A Basin which are at least as stringent as that in place in Kootenai County in 1994</p>	<p>+ 4</p>	<p>SC, BC, CT, Cities in 3 Counties</p>	<p>variable</p>		<p>EPA §319, fees, utility, State of Idaho, counties</p>			
<p>Action 5. Identify areas with a high erosion risk on plat maps of new subdivisions to inform prospective buyers/builders of the true cost involved in site development. Conduct periodic audits on BMP implementation and effectiveness.</p>	<p>+ 4</p>	<p>KC, BC, SC, CT. Cities in CdA Basin DEQ</p>			<p>developers</p>			

Table 24. Management actions recommended by the development and stormwater technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
Action 6: Review the need to increase minimum lot sizes, increase surface water setbacks, and preserve native vegetation buffers. If necessary, develop ordinances designed to minimize sediment and phosphorous export, maintain stable lakeshores and streambanks, and ensure there will be no net increase in phosphorous exported from new development. Any new ordinances should be based on the performance standard of "no net increase" in phosphorous. New standards should apply to new, existing and platted lots along the lakeshore and its tributaries. Any variances granted should be contingent upon the project achieving no net increase in sediment and phosphorous export from development sites.	2-3	KC, BC, SC, CT, Cities in CdA Basin DEQ						
Action 7 6: Prohibit burning of construction debris on lakeshores and adjacent to streams and drainageways.	4	KC, SC, BC, Local Fire Dists						
<i>Action 7 Evaluate the level of treatment and stormwater retention needed for roads and highways in the Basin; expand regulation and policies as needed to prevent contaminants from reaching the water.</i>	4	<i>All road jurisdictions in the Basin</i>						

Notes:

Action 1a. - The University of Idaho Cooperative Extension System has a Water Watch manual which may be adapted for this purpose. The UI has conducted Master Water Watch programs in the past and is willing to do so again if funding is available and other agencies participate in planning and recruiting participants.

Action 2a. - Erosion control techniques for installation of utilities might include reseeded of disturbed areas, locating utilities away from streams and drainages, and timing projects to avoid rainy seasons.

Action 3a. - This would essentially be a pollution trading system, designed to offset new phosphorus loads by reducing existing loads. Mitigation actions might include: providing funds for upgrading the Page sewage treatment plant (to increase its phosphorus removal capabilities); replacing substandard septic systems; removing unneeded dirt roads; or surfacing poorly constructed dirt roads which are eroding into Lake Cd'A or its tributaries.

~~Existing BMP handbooks emphasize the use of grassed infiltration areas or "swales" for treating stormwater. While swales are an excellent stormwater treatment method on the Rathdrum Aquifer, they are often unsuitable in lake watersheds with steeper slopes, less permeable soils, and high water tables. Other stormwater treatment methods should be emphasized in these areas.~~

The cost of implementing these actions will vary depending on the number and site characteristics of new developments, and on the desired effectiveness of the program; costs probably range from \$50,000 - \$120,000 per year.

Action 3g. - If a stormwater utility were formed it would be important to clearly define how the monies would be used (e.g. inspection and maintenance of stormwater systems).

~~Action 5 The purpose of this action would be to ensure that prospective buyers are aware that building on erosion prone sites may be difficult or impossible, and very costly.~~

~~Action 6 The Basin Development TAG agreed that the need for increased setbacks and native vegetation buffers should be examined. They agreed that setbacks and buffers should be adequate to minimize sediment and phosphorus entering the lake, and to maintain a stable lakeshore and streambanks. Any new requirements should be based on water quality performance standards (such as a certain level of treatment, or a certain allowable quantity of phosphorus discharge), allowing setbacks to vary based on slope, soil type, vegetative cover etc. Also it was suggested that any buffer requirements be waived in cases where there is no vegetation (e.g. a rock slope or bluff). Any variances granted should be contingent upon the project achieving no net increase in phosphorous and sediment export from development sites. The TAG could not agree on a width to recommend for buffer strips, if they are needed; suggested minimums ranged from 25 feet to 75 feet plus 4 feet for each % of slope.~~

-Overall Comments: Establish/develop performance measures to determine cost effectiveness of Action Items. Establish lead stormwater agency for implementation.

Table 25. Management actions recommended by the roads technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
Goal: Substantially reduce sediment and phosphorus export from roads; manage new roads so there is no net increase in phosphorus export.								
Action 1: Identify owners of problem roads and driveways (USFS, state, County, highway District, City and private <i>and reduce or eliminate sediment_delivery to the lake or its tributaries from these sources</i> . Use road improvements <i>to mitigate</i> increased phosphorus loads from new development. Encourage the use of the most cost effective, simple, expedient alternatives.	1 2	KC, USFS, IDL, BC, SC, highway dists, DEQ, <i>ITD, CT, IPR</i>			EPA, <i>Programs</i> fees, SW utility, developers, State, counties, <i>BIA</i>	Obliterations: \$105-\$635/lb P Reconstruction \$2800-\$4900/lb plus periodic maintenance and oversight of maintenance		
Action 2: Develop <i>and enforce</i> regulations establishing minimum construction standards, recognizing practical site limitations. Implement an education program to increase awareness of the regulations. Provide landowners <i>who that</i> are harvesting timber with information on residential road construction standards through the Idaho Department of Lands. <i>Work with IDL to fix loophole of using FPA "roads" for sub-developments and individual homes.</i>	2 +	KC, BC, SC, CT, IDL, ITD, DEQ, highway dists			fees, developers, counties	<i>Lead Agencies please provide comments and cost estimates</i>		
Action 3: Incorporate water quality protection strategies into existing road standards, policies, procedures and decisions. Evaluate and, if necessary, revise or eliminate excessive requirements which impair water quality	4 +	ITD, KC, BC, SC, Cities in Basin, CT, highway dists, DEQ				<i>Lead Agencies please provide comments and cost estimates</i>		
Action 4: Prevent sediment from entering road ditches from adjacent properties by adopting and enforcing erosion control and grading ordinances for development activities.	4 2	KC, BC, SC, Cities in Basin, CT, ITD, IDL			See storm-water section	<i>Lead Agencies please provide comments and cost estimates</i>		
Action 5: Support adoption of ordinances, funding mechanisms, and programs which reduce road impacts to water quality.	2	General Public			N/A	N/A		
Action 5: 6: Request that the State, cities, counties and highway districts <i>will</i> identify and prioritize road related water quality improvement needs, that they and develop long range plans for correcting existing problems. and that they complete at least one priority project each year.	3 +	<i>DEQ</i> , highway dists, SC, BC, ITD, Cities in Basin, <i>CT, IDL, USFS BLM, USFS, IDL, BLM, KC</i>			EPA 319 <i>programs</i> State of Idaho, counties	<i>Lead Agencies please provide comments and cost estimates</i>		

Table 25. Management actions recommended by the roads technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
Action 6-7 : Provide state, county, city and highway district personnel, businesses, and the public with technical assistance, including a) assistance in identifying situations and site specific problems affecting water quality, and b) information on maintenance and construction BMPs which can be used to reduce road impacts to water quality. Request that ITD personnel act as mentors to county and highway staff, and that they assist with training of county road crews by inviting them to training seminars and providing them with printed materials and video tapes of IDT seminars.	4 +	ITD, DEQ, KC, CT, highway dists, SC, BC			EPA 319 programs State of Idaho, Fed highway funds, KC, SC, BC, CT	<i>Lead Agencies please provide comments and cost estimates</i>		
<i>Action 7: Encourage ITD and other road jurisdictions to hold public meetings prior to and during implementation of construction projects.</i>	4	<i>Gen Public</i>		<i>Minor</i>				
<i>Action 8: Request that road jurisdictions (ITD, highway districts, counties) control erosion during construction and maintenance activities.</i>	4	<i>DEQ, CT and all road juris in Basin</i>			<i>EPA 319, State of Idaho</i>	<i>Lead Agencies please provide comments and cost estimates</i>		
<i>Action 9: Provide private land owners with an education and assistance program to install/implement road BMPs.</i>	4	<i>DEQ, ITD</i>			<i>EPA programs State of Idaho, KC, SC, BC, CT</i>	<i>Lead Agencies please provide comments and cost estimates</i>		
Action 8: Use LIDs (local improvement districts) to fund road improvements in populated areas.	2	KC, SC, BC, cities in Basin			private			
Action 9: Encourage road jurisdictions to conserve financial resources by consolidating and/or sharing equipment, staff and functions (e.g. share wash pads, hire a grant writer for road improvement grants, consider having highway districts take over some functions of city road departments, if mutually agreed upon).	3	USFS, ITD, highway dists. BC, SC, Cities in Basin, PAC, HDL			May be possible with existing staff			
Action 10: Secure grants and other funding sources for road related water quality improvement projects. Develop local, innovative funding of road programs which improve water quality, and which do not rely on property taxes.	1	PAC, highway dists., SC, KC, BC, ITD, CT, Cities in Basin			EPA §319, vehicle license fees			
Action 11: Increase the general public's awareness of BMPs which should be used to control erosion and manage stormwater runoff, so they will recognize problems when they see them. Emphasize maintenance of private roads and driveways.	1	CLCC, ITD, KC, SC, BC, DEQ			EPA §319, State of Idaho, counties	variable		

Table 25. Management actions recommended by the roads technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
Action 12: Provide ITD and other road jurisdictions with vigorous, direct, constructive input about problem sites (e.g. bare slopes, erosion problems). Request that road jurisdictions use vegetative buffers between disturbed areas and streams/ drainages leading to streams.	1	General Public			N/A	N/A		
Action 13: Strongly encourage ITD to complete the revegetation of the Mica grade and I-90 east of Cd'A (above Wolf Lodge Bay).	1	ITD			State of Idaho			
Action 14: Request that volunteers responsible for litter collection on state highways also identify problem areas for ITD. Encourage, train and assist these groups to plant trees and other vegetation on cuts and fills.	3	ITD			State of Idaho			
Action 15: Encourage the public to review proposed construction projects.	2	ITD, General Public			N/A	N/A		
Action 16: Evaluate the level of treatment and stormwater retention needed for roads and highways in the Basin; expand regulations and policies as needed to prevent contaminants from reaching the water.	1	DEQ, CT and all road jurisdictions in the Basin			EPA §319, State of Idaho			
Action 17: Request that road jurisdictions (ITD, highway districts, counties) control erosion during maintenance activities.	1	all road jurisdictions in the Basin			State of Idaho, counties			

Notes:

Action 3—The new Kootenai County road standards are in conflict with the stormwater ordinance and the related provision in the subdivision ordinance. It may be beneficial to water quality to permit private and small subdivision roads to serve the residential needs of a rural neighborhood without requiring large cutbacks and switchbacks which remove an excessive amount of vegetation. Variances should allow narrower roads with greater slope and more vegetative cover if it will reduce the quantity of contaminants flowing into the water, without compromising safety.

Action 6—Road jurisdictions will need technical assistance to identify erosion and stormwater problems, and to develop mitigation plans.

Action 9—The highway districts in Kootenai County already share some equipment and assist the cities on a case by case basis. Any consolidation of district services would have to be mutually acceptable to all involved agencies.

Action 10—The Lake Cd'A Property Owners Association may wish to participate in raising grant match monies for specific projects which will enhance lake water quality.

Action 12—These buffers could be temporary, used only during construction, which might eliminate the need to purchase easements.

Action 17—Erosion control actions which might be appropriate during maintenance activities include seeding ditches following cleaning and using loose straw and silt fence on soils disturbed during replacement of culverts.

Table 26. Management actions recommended by the wastewater technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
Goal: Eliminate and/or reduce discharge of nutrients in wastewater. Prevent impacts to beneficial uses as defined in the Idaho Water Quality Standards (beneficial uses include swimming, domestic drinking water, etc.).								
Action 1: Request that DEQ, EPA and a citizen committee use the Total Maximum Daily Load process to Evaluate impacts, conduct a financial evaluation of alternatives, and if needed, <i>recommend implementation strategies for select methods of</i> reducing phosphorous loads from wastewater treatment plants, beginning with the South Fork Sewer District's Page facility. Consider Basin wide funding alternatives.	3 +	DEQ, EPA, CT			Fed grants, State of Idaho, fees	See Notes		
Action 2: a) Identify old <i>substandard and failed</i> sewage disposal systems located along the tributaries and lakeshore in the Cd'A Basin. Develop a data base which can be used to locate and prioritize systems needing attention; b) Prioritize systems for upgrade and/or replacement based on their probable nutrient contribution to the lake.	a) 1 b) 2 1	PHD, DEQ, CT			EPA, \$319, State of Idaho, Counties			
Action 3: Encourage replacement of substandard sewage disposal systems by: a) Allowing nutrient loads for new development to be offset with upgrades to off site systems through a pollution trading system. b) Developing cost share and other incentives <i>c) Develop a standard for pollution reduction for proposed practices.</i> <i>*Develop monitoring program for septic systems.</i>	2	PHD, DEQ	CT		Private developers State of Idaho, EPA \$319	= \$4,400 - \$6,100 per pound P removed		
Action 4: Improve maintenance of private sewage systems throughout the Cd'A Basin. Develop an operation permitting or monitoring system and periodically inspect systems to ensure they are being maintained and are functioning properly. Vary inspection frequency according to need or use. Periodically mail maintenance reminders to homeowners with private systems.	4 +	PHD, DEQ, CT	CT		fees, private, counties			
Action 5: Use septic maintenance companies to help educate and communicate with homeowners about substandard sewage systems.								
Action 5 6 Evaluate and, if appropriate, modify private and Health District and state inspections of new sewage systems to ensure that systems are properly installed, and that inspection programs are as efficient as possible.	4 2	PHD, DEQ			May be possible with existing staff			

Table 26. Management actions recommended by the wastewater technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
Action 6 7: During plan reviews of both new and replacement sewage systems, consider clustering of the systems if it will have less impact on water quality than small, individual systems.	4 +	DEQ, KC		Ongoing	May be possible with existing staff			
Action 8: Study the effect of nitrogen <i>nutrients</i> on water quality, particularly in near shore areas. Where nitrogen is <i>nutrients are</i> affecting water quality, identify and/or develop and install sewage systems which are more effective at removing nitrogen <i>nutrients</i> from effluent.	4 2	USGS DEQ			EPA grants, State of Idaho			
Action 9: Develop a method of pollution trading and/or credits so that increased phosphorus loads from new development can be offset by upgrading sewage treatment (i.e., new developments could have the option of mitigating their impact by contributing to a fund for needed upgrades.)	2	DEQ, EPA			EPA grants, State of Idaho			
Action 9 10: Ban phosphorus from commercial and residential laundry detergent and other cleaning products (e.g. dish washing detergent) throughout the Cd'A Basin. Evaluate expansion of phosphorous ban of laundry detergent to other cleaning products.	4 +	KC, BC, SC, All Cities			Existing staff	<i>minimal</i>		

Table 29. Management actions recommended by south lake* technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
Goal: Reduce nutrient loading to South Lake in the most effective and cost effective manner.								
<u>Reduction of Nutrient Load in Lake Bed Sediments</u> Action 1: Slowly reduce nutrient load by systematically harvesting macrophytes. Investigate and implement mechanical harvest for co-generation, fertilization, compost or methanol production.	1	DEQ, IP&R, 3 counties Tribe, DEQ, I&FG, IP&R, I.D.L., CLCC		None	AVISTA Re-authorization County Waterways Committee Tribe, Federal Program, Develop Corp, Panhandle area Council-Dept of Commerce, Parks & Rec, User fee of \$3	Substantial	\$0	
<u>Reduce sediment/nutrients loading from river/lake bank erosion.</u> Action 2: Control bank & bottoms sedimentation by expanding and enforcing no-wake zones, controlling log boom scower and managing the size and speed of boats.		Kootenai, Benewah counties IP&R, Tribe Counties IP&R, Corp. of Eng., I.D.L.		Minimal: leaflet to educate public	IP&R Coast Guard Grant, County Fees	2 FTEs @ \$75 K each = \$150K	\$0	
Action 3: In AVISTA dam reauthorization FERC relicensing authorization process, evaluate lake level (fluctuations and management) upon shoreline erosion and river bank sloughing.	2	Tribe		None	AVISTA	?	?	
Action 4: Work with landowners (gov't or private) to secure riparian zone management. Use voluntary methods such as conservation easements, long-term leases, donation, purchase, etc. Intent: minimize sediment and nutrients entering streams, wetlands.		Tribe (in reservation) NRCS, Counties		Some success within Reservation	Various	Substantial	?	
Action 5: Development of riparian buffer strips and stream stabilization along all tributary streams that flow directly into the lake.	1			Some success within Reservation & several RCD projects	Various	Substantial- \$1 million per year for 10 years	?	
Action 6: Development & implementation of sediment, nutrient TMDLs for various Lake Cd'A tributaries as needed based on monitoring data.		Tribe (in reservation) IDEQ, other Tribes		Tribe-a few projects done.	EPA, CW grants, state, fed AG grants	\$250K per year for 10 years?	?	

*South Lake concerns intended to include Coeur d'Alene Lake south of Harrison, plus all bays and shallow areas (0-20' depth).

Table 29. Management actions recommended by south lake* technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
<i>Action 7: Develop and implement a comprehensive WQ monitoring effort in all shallow water areas and tributary streams.</i>	<i>1</i>	<i>Tribe, IDEQ, USGS, EPA</i>		<i>Preliminary monitoring plans underway</i>	<i>Tribe, IDEQ, EPA</i>	<i>\$150K per year</i>	<i>\$0</i>	
<i>Action 8: Develop public education program for upland landowners: leaflet, etc. Set up an ongoing I & E effort.</i>	<i>2</i>	<i>Basin Comm, Tribe, IDEQ, IDL, RCDs</i>		<i>Minimal-through logger contracts</i>	<i>Basin Comm, Tribe, IDEQ, IDL, RCDs</i>	<i>\$5-10K per year</i>	<i>\$0</i>	

Comments:

Action 1: Will need substantial funding by agencies; cannot depend on private business to do. Investigate feasibility and implement as indicated. Monitor, evaluate effectiveness. Tribe final authority within reservation. Consult w/ Dr. Falter.

Action 2: Unsuccessful policy for no-wake zone on CdA River due to lack of funding and public support.

Action 3: Tribe has invested \$1 million in past 4 years.

Action 4: Voluntary actions with landowners - no condemnation.

Action 6: Tribe has invested \$1 million in past 4 years.

Action 7: Some monitoring data available, but much more needed

Action 8: Not a one-shot program. Must be ongoing, widespread.

The South Lake Technical Advisory Group recommends to the Lake Planning Workgroup that the only action item that should be considered is the development of an "Integrated Aquatic Plant Management Plan". The emphasis of the "Plan" should focus on removal of aquatic plants from the South Lake by means of Mechanical Harvesting. During the scoping process many alternatives were considered and dismissed for various reasons but primarily because of environmental impacts. Methods of aquatic plant management that were considered including moving, biological control, bottom barriers, rotovating, dredging, herbicides, and mechanical harvesting. Because of the size and complexity of the South Lake, a combination of some of the above mentioned methods most likely will need to be addressed in the "Plan".

* South Lake concerns intended to include Coeur d'Alene Lake south of Harrison, plus all bays and shallow areas (0-20' depth).

Table 30. Management actions recommended by the rivers technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
Goal 1: Reduce accelerated stream bank erosion on the lower St. Joe by 25% and Coeur d'Alene River by 50% over the next decade.								
Action 1: Inventory rapidly and moderately eroding banks in the slackwater reaches of the CdA and St Joe banks.	1	SWCD, Tribe DEQ, USGS		CdA R-Inv completed at 96 flood	Current monitoring resources	minimal \$10-40K (20 K Tribe)	0	
Action 2: Develop an informational pamphlet for distribution to boat registrants educating them on the damage caused by boat wakes to riverbanks.	1	Tribe, IDPR GBRP		Partial, in Kootenai Cnty only	GBRP—Public Education Budget	\$2,500	0	
Action 3: Develop and support legislation enabling counties to assess user fees dedicated to lake protection activities including bank stabilization.	2 +	Local legislators, Commissioners GBRP, CAG		None	? GBRP mechanism counties	Minimal	0	
Action 4: Develop a standardized <i>suite of technologies and cost efficient bank stabilization method</i> for eroding CdA River banks and St. Joe River.	1	NRCS/RCD, EPA, DEQ, Tribe, Land-owners, AGOE, IDWR, IDL, DEQ, IDFG, USF&WS		NRCS /CDs have methods for St Joe 4 miles banks done on St. Joe	? Agency budgets	minimal Est min \$22/lin ft \$3.5 million	0	
Action 5: Develop a log or tree revetment demonstration project for undeveloped banks of the St. Joe River. Log or tree revetments are logs or trees placed and anchored under an undercut bank to absorb the wave energy and resist further bank undercutting.	1	State, BLM GBRP Cooperating agencies		Some trails done on CdA River	? GBRP, DEQ, EPA	\$8k	0	
Action 6: <i>Armor and vegetate Using a suite of approved technologies to stabilize</i> rapidly eroding banks as budget allows according to priorities of Rivers TAG (list). Priorities will be established after the bank erosion inventory is completed.	1	SWCD, Tribe, IDFG, AGOE, IDL, IDWR, IDFG, & DEQ		5-mi on St. Joe (RCD) small demos on Cd'A River	? Federal Grants-State WPCA-Users Fees-counties	\$3.5M \$1,000,000+	0	
Action 7: Develop support for public land managers (IDFG, IDL, USFS, BLM) to implement bank stabilization on the public lands. <i>Armor Stabilize</i> banks at all existing recreation sites and any new sites developed.	2 +	Basin Comm GBRP, CAG		Minimal	Comm GBRP mechanism	Minimal	0	
Action 8: Identify sources of trace (heavy) metal loads in the Cd'A River between Cataldo <i>Enaville</i> and Harrison with special attention to: a) Need for tailings removal from banks or channel; b) Advantage of stabilizing water levels in the river or its wetlands; c) Assess if bank stabilization will be effective in curtailing metals loading; d) Monitoring of the bank erosion rate.	1 2	EPA USGS, NRDA, Trustees, DEQ, CBRP, WWP			EPA, DEQ Federal grants-State WPCA	? \$75,000	0	

Table 30. Management actions recommended by the rivers technical advisory group

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
<i>Action 9: Study feasibility and cost effectiveness of stabilizing water levels in the wetlands and Cd'A River. Include Cd'A Lake level mgt in evaluation.</i>	1	EPA, AVISTA Process		None, Post Falls dam process work groups organized	EPA, AVISTA	?	0	
<i>Action 10: Contract with nationally recognized river hydrology experts to develop a total river system management plan for North Fork and South Fork Cd'A River above Cataldo.</i>	?	Basin Commission		None-new	Multi-agency	?	0	

Comments:

Action 1: St Joe--3 yr effort needed. Can Tribe do it below St Maries, NRCS/RCD upstream? role of ACOE? Use same methodology as on CdA R.

Action 2: Need to expand effort into Benewah, Shoshone & Spokane counties. Try to have IDPR send out reminders w/ boat registrations. Need to review & update brochure to reflect Tribal ownership.

Action 3: Need legal staff work & details on how this might be done.

Action 4: St. Joe--4 mile cost \$277 k (stabilization only, no fld/wetlnd mitigation). CdA Riv-EPA cleanup will do some for metals. Focus on techniques we know will work.

Action 5: Works if done correctly--need refinement. Permits required by ACOE and Tribe and respective jurisdictions.

Action 6: Give high priority to banks at lower end of river systems, work upstream from Lake. Get several priority projects on-the-shelf ready for funding. Permits required by ACOE and tribe and respective jurisdictions

Action 7: Encourage environmental and other interest groups to aid agency projects with labor and/or \$\$ for matching funding. Permits required by ACOE and tribe and respective jurisdictions

Action 8: Need to coordinate LMP process with EPA RI/FS (ROD) cleanup.

Action 9: As a possible alternative to removals to stabilize banks and minimize metals migration into Lake.

Action 10: Needed for coordinating long-range planning of riverbank and basin to benefit lake water quality.

Goal: Educate private landowners and governmental managers engaged in bank stabilization on the St. Joe and Coeur d'Alene Rivers on the nationwide permit available, stabilization guidelines and suggested approaches.

Action 1: Develop a pamphlet explaining the U. S. Army Corps of Engineers <i>and the Coeur d'Alene Tribe's</i> bank stabilization permit <i>process</i> , stabilization design features and recommendations on methods to develop beach and wildlife areas.	1	ACOE, Tribe, NRCS/RCD ACOE, IDWR, IDL, DEQ, IDFG, USF & WS		Minimal	ACOE, Tribe GBRP mechanism	\$2.5K	0	
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Comments:

Action Item 1: Use ACOE national brochure and edit/add to make it more local to reflect local jurisdictions, needs.

Table 31. Motorized Watercraft

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
<i>Action 1: Pursuant to applicable codes safety inspections conducted by county and tribal marine deputies in the Lake Coeur d'Alene drainage basin shall include an examination of wastewater facilities on the craft to ensure their compliance with the referenced codes. Any violations shall be enforced according to said codes.</i>	1	County, PHD, Tribe		Counties; ongoing Tribe; proposed yet unfunded	County, PHD ?		? \$0	
<i>Action 2: It is recommended that IDAPA 41,1,200,01.(d) be amended as follows: If any watercraft located upon the waters of this District is found to have wastewater facilities which are not in compliance with the requirements of this section, the Health Officer or enforcement person shall have the following alternative or cumulative powers to:</i> <i>i. cause the wastewater facilities to be locked and sealed to prevent usage.</i> <i>ii. require such watercraft to be removed from the waters of this District until the wastewater facilities are made to conform with the requirements of this regulation.</i>	1	Legislature, PHD, County			Legislature, PHD, County			
<i>Action 3: Recommend that public and private marinas comply with applicable codes regarding pumpout and shore-based facilities.</i>	1	PHD Tribe		Counties; ongoing Tribe; education	PHD, Private, Tribe?			
<i>Action 4: All motorized and non-motorizes watercraft used by campers to transport themselves to disperse, undeveloped campsites on Lake Coeur d'Alene or its tributaries, shall carry at least a porta-potty or privy shovel, and must comply with the restrictions if Idaho Codes 67-7505(1) and IDAPA 41.1.200,01.</i>	1	County, USFS, PHD Enforcement: County, USFS, PHD			County, USFS, PHD			
<i>Action 5: In accordance to IDAPA 16.01.02800 no boats shall be winterized in such a manner that anti-freeze, either ethylene or propylene glycol, will be discharged into Lake Coeur d'Alene or its tributaries, or onto the ground.</i>	1	DEQ-M&TS Enforcement: DEQ-M&TS			DEQ			

Table 31. Motorized Watercraft

Management Actions	Priority	Lead Group	Other	Actions to date	Funding Sources	Estimated Costs	Available Funds	Funding Difference
<i>Action 6: A public I & E program shall be developed and directed by the project manager on: effective methods of winterization of boats; pumping of holding tanks; fuel and oil transfers and spillage cleanup; proper boat cleansing procedures; safe boat operation; and ways to assure that these and other lake-oriented activities are conducted in an environmentally sound fashion. The program shall target boat owners, marina and resort owners, and the general public.</i>	<i>1</i>	<i>Basin Commission</i>	<i>Tribe State</i>	<i>Proposal submitted by Commission staff.</i>	<i>CWA</i>	<i>\$10K/yr</i>	<i>\$0</i>	<i>?</i>
<i>Action 7: All boats shall have on-board a container to receive all solid waste generated there.</i>	<i>1</i>	<i>Counties Tribe</i>			<i>County</i>			

Notes:

Item 2: The wording 'wastewater facilities' includes marine toilets. Boats which generate blackwater from toilets and greywater from sinks and showers must have a holding facility so that no discharges can be made.

SECTION 4: PROPOSED WORK PLAN FOR LIMNOLOGICAL MONITORING & EVALUATION OF COEUR D'ALENE LAKE

Introduction

The data collection and evaluation activities described in this proposed environmental monitoring work plan for Coeur d'Alene Lake have been designed to address the monitoring needs of both the Coeur d'Alene Basin Environmental Monitoring Program and the comprehensive lake monitoring program associated with the Lake Management Plan. Coeur d'Alene Basin stakeholders involved in the development of this proposed monitoring plan include the U.S. Geological Survey, the States of Idaho and Washington, Coeur d'Alene Tribe, Spokane Tribe, U.S. Fish and Wildlife Service, and the U.S. Environmental Protection Agency.

It should be recognized that, at the request of the parties currently revising the Coeur d'Alene Lake Management Plan, the proposed monitoring plan development for Coeur d'Alene Lake has been on a faster track than development of the Basin-wide plan. As development of the Basin-wide monitoring plan proceeds and monitoring data quality objectives are refined, the Plan proposed herein for lake monitoring will in turn be revised accordingly.

Background

The long-term mining and processing of metal-rich ores within North Idaho's Coeur d'Alene Basin has produced widespread metal contamination of soil, sediment, water, and biota within the Basin. The risks posed to human and environmental health by that contamination prompted the U.S. Environmental Protection Agency (EPA) to conduct a Remedial Investigation/Feasibility Study (RI/FS) of the Coeur d'Alene Basin. That study, begun in 1998, resulted in the Coeur d'Alene Basin Record of Decision (ROD), which was finalized in September 2002. The remedial action selected in the ROD is focused largely on mining-related contamination within the floodplains and river corridors of the Coeur d'Alene Basin, exclusive of the populated and unpopulated areas within the Bunker Hill "Box".

The Ecological Risk Assessment (EcoRA) performed within the RI/FS included Coeur d'Alene Lake; mining-related hazardous substances listed for the lake included contaminated lakebed sediments and surface water. The EcoRA also noted that nutrients were a significant concern for the lake because they could change the lake's trophic status, or level of biological productivity, which could result in secondary releases of metals from contaminated lakebed sediments. The ecological effects of mining-related hazardous substances in the lake are not well understood because of the very limited biological sampling (i.e., migratory birds and fish) that has been conducted in the lake.

Coeur d'Alene Lake is not included in the selected remedy of the ROD. Instead, EPA has agreed to defer its remedial decision for the lake until actions taken by other entities, outside of the Superfund process, have been shown to be implementable. Specifically, a

lake management plan developed by a consortium of state, tribal, federal, and local governments would implement numerous actions in order to reduce the likelihood of metals being released from the lakebed sediments. The primary focus of the lake management plan would be to reduce watershed-derived inputs of metals and nutrients to the lake. That focus would be complementary to many of the remedial actions promulgated by the ROD for reduction of metal loads and concentrations upstream of Coeur d'Alene Lake.

The remedy selected by the Coeur d'Alene Basin ROD recognizes that contamination will remain on-site into perpetuity. As such, there are legal requirements for environmental monitoring when, upon completion of a remedial action, hazardous substances, pollutants, or contaminants will remain on-site. Under Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 and under the Superfund implementation regulations, if contamination remains on-site then post-response reviews are required every five years in perpetuity to ensure protection of human health and the environment. CERCLA states that the focus of the five-year review should be an assessment of monitoring data to evaluate whether the remedy continues to provide for adequate, risk-based protection of human health and the environment (40CFR 300.430 (f) (4) (ii), (2002)). Additional authority regarding monitoring gives the U.S. EPA authority to undertake monitoring to identify threats (42 U.S.C. 9604(b)) and defines remedial actions as inclusive of any monitoring reasonably required to ensure that such actions protect the public health, welfare, and the environment.

EPA's Coeur d'Alene Basin ROD encourages the collaborative development of a Coeur d'Alene Basin environmental monitoring program (see Section 12.6 in the ROD), which would include Coeur d'Alene Lake. The ROD, at Section 12.3, states the following in relation to monitoring of Coeur d'Alene Lake:

"The Coeur d'Alene Tribe, IDEQ, and EPA, along with others, plan to coordinate a comprehensive lake monitoring program to evaluate the effects of upstream cleanup, potential sources of contamination and potential impacts to the lake and the Spokane River. If conditions change or new information that modifies the current understanding becomes available, additional actions will be evaluated. Evaluation of lake conditions will be included in the five-year review process."

It is anticipated that the Coeur d'Alene Basin environmental monitoring program would have two main components to address the various data needs, including the CERCLA five-year review data requirements. The first would be a long-term status and trends assessment of surface water, soil, sediment, and biological resource conditions in the Basin. The second component would be remedial action-specific effectiveness monitoring and would be developed as part of the design of each remedial action.

The environmental monitoring program's approach to Coeur d'Alene Lake would focus on the monitoring and evaluation of trends in water quality, sediments, biological

resources, and metal flux from lakebed sediments. The Lake Management Plan for Coeur d'Alene Lake is separate from the ROD, but also plans to establish a comprehensive lake monitoring program to evaluate the effects of upstream cleanup, potential sources of contamination, and potential impacts to the lake and its outlet, the Spokane River. The expectation is that the collaboratively developed Basin-wide monitoring plan and the lake-specific aspects will address the needs of both future CERCLA-required five-year reviews and the Lake Management Plan. By combining and collaborating on these monitoring efforts, the expectation is that monitoring of Coeur d'Alene Lake can be conducted cost-effectively and efficiently, thereby minimizing duplication of efforts.

Objective and Scope

As part of the Coeur d'Alene Basin Environmental Monitoring Program, the monitoring program for Coeur d'Alene Lake has been designed to provide complementary data and information relative to the following three Basin-wide objectives:

1. Long-term status and trends assessment of surface water, soil, sediment, and biological resource conditions in the Basin.
2. Effectiveness monitoring of remedial actions implemented under the Coeur d'Alene Basin ROD.
3. Performance of management actions implemented under the Coeur d'Alene Lake Management Plan.

The goal is to utilize highly focused sampling of physical, chemical, and biological characteristics over a range of spatial and temporal conditions in order to evaluate the interaction of metals, nutrients, lake productivity, and ecological health. The limnological data would be complementary to concentration and load data for sediment, metals and nutrients monitored at the lake's two primary inflows, the Coeur d'Alene and St. Joe Rivers, and the lake's outlet, the Spokane River.

The scope of the monitoring program is segregated into the following four data-collection and evaluation activities, which are further discussed in the monitoring approach discussion that follows.

1. Mass balances of metals and nutrients.
2. Nutrients and lake productivity.
3. Fate and transport of metals.
4. Ecological health.

The geographic scope of the monitoring includes the following four habitat types.

1. Lacustrine, pelagic zone of lake.
2. Lacustrine, littoral zone in selected bays of lake.
3. Palustrine and riparian, selected shoreline areas of lake.
4. Riverine, mouths of Coeur d'Alene and St. Joe Rivers and lake outlet.

Depending on the availability of monitoring funds, the intention is to fully implement the monitoring plan for Coeur d'Alene Lake for the five years leading up to the initial five-year review mandated by CERCLA and the National Contingency Plan. Monitoring

results would be summarized and evaluated on an annual basis. In preparation for the initial five-year review, a more intensive and integrative evaluation would be performed to address the numerous issues likely to be raised during the review. The primary issue would be an evaluation of the progress of remediation and management actions in relation to status and trends and achievement of benchmarks. There would also be an evaluation of the scientific understanding that has been gained by the monitoring program. Appraisal of the performance of the monitoring program would also be conducted to facilitate decisions about the future direction and scope of the program.

Monitoring Questions

As noted above, the monitoring program will be established as part of the implementation of the ROD and is critical to the successful implementation and evaluation of the cleanup remedy (further discussed in the ROD at Section 12.6). To start development of the Coeur d'Alene Basin Environmental Monitoring Program, EPA formed a multi-agency committee in January 2002. After considerable discussion, the committee determined that the basin-wide status and trends monitoring program, as well as the remedial-action-specific effectiveness monitoring, will be structured to provide data needed to evaluate the following issues:

1. Trends in dissolved zinc and cadmium concentrations in surface.
2. Trends in particulate lead loads and concentrations in surface water.
3. Trends in lead concentrations in the flood plain soils/sediment, levees, and riverbed sediments.
4. Progress towards achieving the benchmarks of the selected remedy.
5. Potential unwanted impacts to the system (e.g., recontamination, nutrient loading, excess sedimentation, etc.) resulting from implementation of the remedy.
6. Changes or trends in biotic benchmarks (e.g., population/diversity, chemical exposure, bioavailability, etc.).
7. Trends in water quality, sediments, and biological resources in Coeur d'Alene Lake.
8. Trends in groundwater quality, where appropriate to evaluate impacts to surface water.

Most of the above issues apply to Coeur d'Alene Lake; however, the committee also has identified the following questions specific to the lake.

1. Is the lake, at present or into the future, a significant source of metals to the Spokane River?
2. What is the proportion of metal input to the lake from riverine and benthic-fluxes?
3. As zinc concentrations are reduced in the lake water, what will be the response in phytoplankton production and benthic-flux rates?
4. Can changes in the lake's dissolved-oxygen budget be correlated with remedial actions in the lake's watershed?
5. What are the current ecological conditions in the lake?
6. Which benchmarks of water-quality and ecological conditions are most appropriate for assessing status and trends in the lake?

Rationale for Monitoring Approach

The proposed approach has been designed, in part, to continue and complement the monitoring of limnological characteristics that has occurred since the early-1990's. However, the proposed approach recognizes that important new limnological information has evolved from more recent studies of the lake. The role of hydrodynamics, both water-column circulation and riverine inflow-plume routing, is now known to play an important role in the fate and transport of metals and nutrients, as well as lake productivity. As such, the timing of limnological data collection addresses critical time periods related to lake hydrodynamics. The lake's mass balance, and thus its behavior as a downstream source, for metals and nutrients results from complex interaction of riverine input and output, benthic flux, and chemical and biological processes within the water column. Ecological conditions of the lake have not been extensively examined to date. Even though the lake serves as important habitat to waterfowl and native fish, including the threatened bull trout, the first comprehensive fish monitoring was completed for the lake in 2002. Additional information regarding migratory bird and fish health is needed into the future in order to assess the impacts of remedial actions on ecological conditions.

The rationale behind the selection of sampling stations, sample timing, and sampled variables seeks to improve understanding of the interaction of physical, chemical, and biological processes on the lake's mass balance and the fate, transport, and export of metals and nutrients by the lake. That improved understanding will facilitate interpretation of water-quality trends in the future as remedial actions are undertaken under the auspices of the Coeur d'Alene Basin ROD and Lake Management Plan. Over the long term, those remedial actions are expected to yield improvements in the lake's water quality. However, as stated in an earlier issue, "Potential unwanted impacts to the system (e.g., recontamination, nutrient loading, excess sedimentation, etc.) resulting from implementation of the remedy", may result in a period in which lake water quality does not meet expectations. The time series of water-quality data generated by this lake monitoring program, in conjunction with a parallel time series of quantitative information on remediation progress, can be used to better understand the net results of short-term perturbations versus the long-term improvements gained from reductions of metal and nutrient loads delivered into the lake.

An important task not yet fully addressed is the identification and quantification of benchmarks for water-quality and ecological conditions for Coeur d'Alene Lake. Benchmarks for the protection of aquatic life in the lake are listed as water-quality standards and criteria for cadmium, copper, lead, and zinc in Table 8.2-3 of the Coeur d'Alene Basin ROD. Benchmarks related to the lake's trophic condition might be based on EPA's ecoregion-based nutrient criteria for lakes and reservoirs; values for total phosphorus, total nitrogen, chlorophyll-*a*, and secchi-disc transparency are listed specific to ecoregion II, western forested mountains, which includes Coeur d'Alene Lake. Other benchmarks (e.g., ecological health, benthic flux rates, dissolved-oxygen deficits) would be developed and/or refined as monitoring data was acquired and evaluated.

Monitoring Approach

This section discusses in more detail the proposed sampling stations, schedule, and the four areas of data collection activities identified above. The specifics included here may be modified or further refined as the Basin-wide monitoring plan is developed. The proposed monitoring approach is also summarized in Table 2.

Sampling Stations and Schedule

Limnological and riverine data collection would be conducted annually, during the course of a water year (e.g., October 1, 2003 to September 30, 2004). Ecological data collection would be conducted at least once during each five-year performance review period required by the ROD. The sampling frequency, number of stations and other sampling parameters will be further refined as part of the data quality objectives development of the overall basin-wide monitoring plan.

Limnological sampling of the lacustrine-pelagic zone is proposed to be conducted at the following five stations: northern lake station southeast of Tubbs Hill, deepest lake station near Driftwood Point, central lake station near University Point, southern lake station near Conkling Point, and Chatcolet lake station (these correspond to stations 1, 3, 4, 5, and 6 on Figure 1). Limnological sampling at the five pelagic stations is proposed to be conducted eight times per water year. The timing of sampling trips at the five pelagic stations is listed in Table 1 and reflects temporal patterns associated with lake hydrodynamics, nutrients and lake productivity, and the fate and transport of metals and nutrients.

Limnological sampling of the lacustrine-littoral zone is proposed to be conducted at twelve selected bays in conjunction with pelagic-zone sampling. Recent sampling (1995-2001) by IDEQ had been conducted on a rotational basis at 19 bay stations during August. To better assess seasonality, this monitoring program would sample twelve bays during mid-October, late January, mid-April, and mid-August. The initial selection of littoral-sampling stations is as follows: Cougar Bay, Kidd Island Bay, Mica Bay, Loffs Bay, Rockford Bay, Windy Bay, Carey Bay, Powderhorn Bay, Carlin Bay, Echo Bay, Squaw Bay, and Beauty Bay (Figure 1). Littoral-zone sampling is proposed to be conducted for a minimum of two years. If water-quality conditions between pelagic and littoral stations were found to be comparable among the four sampled times, then future littoral sampling could be reduced to one time period (e.g., mid-August).

Riverine sampling is proposed to be conducted at three stations as part of this lake monitoring program in order to complement lake water-quality monitoring. Figure 1 shows the three stations: Coeur d'Alene River near mouth, St. Joe River near mouth, and Spokane River at lake outlet. Periodic, hydrograph-based sampling at the three riverine stations would provide the concentration data for sediment, metals, and nutrients required for load calculations. Continuous measurement of streamflow entering the lake would be made at the Coeur d'Alene and St. Joe River stations; streamflow exiting the lake would

be continuously measured at the USGS gauging station on the Spokane River at Post Falls.

Ecological health sampling is proposed to be conducted at selected stations located in the palustrine, riparian, and lacustrine zones of the lake. Such sampling is proposed to be performed at least once within each five-year performance review period.

Mass Balances of Metals and Nutrients

The evaluation of mass-balance data in conjunction with the limnological and riverine data would lead to an improved understanding of the relative roles of riverine and benthic contributions of metals and nutrients into and out of the lake. Evaluation of mass balances requires information such as water-residence time, lake volume changes, advective-transport processes, and spatial and temporal concentration data for constituents such as metals and nutrients.

In order to generate the requisite hydrologic information, the Coeur d'Alene and St. Joe River monitoring stations would be equipped with acoustic Doppler velocity meters to continuously monitor river discharge. River discharge from the lake would be measured at the existing USGS gage on the Spokane River near Post Falls. Lake-stage data, used to assess volume changes, is currently recorded at a USGS gage on the northern end of Coeur d'Alene Lake.

Monitoring of lake hydrodynamics would focus on evaluation of water-column circulation and advective routing of riverine inflows. The primary variables to be monitored within the lake include water temperature, specific conductance, and percent light transmission (or turbidity). Water-column profiles would be collected eight times per year at the five pelagic stations, in conjunction with metals and nutrient sampling. In years of highly elevated stream discharge, additional profiles would be collected lake-wide in order to track the spatial extent of the inflow plumes.

The spatial and temporal coverage of constituent concentrations that would be generated by the limnological and riverine monitoring, in conjunction with measured volume changes in the lake, would yield the data needed to calculate accurate mass balances for metals and nutrients. This element of the lake monitoring program would also provide the necessary data for evaluation of the status and trends of metal and nutrient concentrations and loads entering and exiting the lake.

Nutrients and Lake Productivity

This element of the lake monitoring program would provide the limnological data needed to calculate or evaluate the following: 1) mass balances for nutrients in the lake, 2) status and trends for lake productivity indices (water-column transparency, nitrogen and phosphorus concentrations, chlorophyll-*a* concentrations, and dissolved-oxygen concentrations), and 3) water-column circulation processes deduced from spatial and temporal changes in physical and chemical properties.

Prior to collection of water samples at the pelagic stations, full-depth profiles of the water column would be done for the following variables: temperature, pH, oxidation-reduction potential, specific conductance, dissolved-oxygen concentration and percent saturation, light transmissivity (a surrogate for turbidity), and fluorescence (a surrogate for chlorophyll). The upper water column would be profiled for photosynthetically active radiation in order to define the euphotic-zone depth; secchi-disc transparency would also be measured. Water-column samples would be collected eight times per year at the five pelagic stations. At the deeper stations (1, 3, and 4), samples would be collected at the following depths: euphotic-zone composite, upper hypolimnion, mid-hypolimnion, and lower hypolimnion (within 1-m of lakebed). The shallower stations (5 and 6) would be sampled in the euphotic zone and upper and lower hypolimnion. The samples would be analyzed for total concentrations of nitrogen and phosphorus and dissolved concentrations of nitrite plus nitrate, ammonia, and orthophosphate. The samples would also be analyzed for chlorophyll-*a* and pheophytin using an appropriate lab method such as fluorometric analysis with acid-correction. The twelve littoral-zone samples collected in conjunction with the pelagic-zone samples would be analyzed in the same manner as pelagic samples, but just for one vertically-composited sample at each station.

Fate and Transport of Metals

This element of the lake monitoring program would provide the limnological data needed to calculate or evaluate the following: 1) mass balances for metals in the lake, 2) status and trends for metal concentrations in the lake, and 3) water-column circulation processes deduced from spatial and temporal changes in metal concentrations.

Water-column samples for metals analysis would be collected in conjunction with pelagic nutrient samples. The samples would be analyzed for total and dissolved concentrations of arsenic, cadmium, lead, zinc, iron, and manganese, as well as hardness. As with nutrients, the twelve littoral-zone samples collected in conjunction with pelagic-zone samples would be analyzed in the same manner as pelagic samples, but just for one vertically-composited sample at each station.

In order to complement the water-column sampling and provide trend monitoring data for benthic flux from the lakebed, samples of surficial lakebed sediments and the associated sediment-water interface would be collected at each pelagic station eight times per year. Samples would be collected by gentle insertion of a gravity coring device into the lakebed. Upon retrieval, the overlying water would be extracted and submitted for the same analysis of total and dissolved metals and nutrients as used for water-column samples.

Ecological Health

Migratory birds inhabiting and feeding in shallow water habitat within the lake would be monitored for lead exposure, this would be accomplished with initial sampling of sediments in feeding areas within several bays. Additional blood lead monitoring of waterfowl occupying these bays would also be conducted.

Fish would be sampled and analyzed for metals from the lower, central, and upper portions of the lake. Based on the results of the 2002 sampling efforts, one species would be selected for long-term monitoring.

An evaluation of water quality for the protection of the threatened bull trout would also be conducted on the basis of water quality data collected by the U.S. Geological Survey and Idaho Department of Environmental Quality.

Participants

As proposed herein, the numerous monitoring tasks would be conducted cooperatively among the U.S. Environmental Protection Agency, U.S. Geological Survey, U.S. Fish and Wildlife Service, Idaho Department of Environmental Quality, and Coeur d'Alene Tribe. The U.S. Environmental Protection Agency would maintain primary oversight of the Coeur d'Alene Lake limnological monitoring and evaluation program.

Budget Estimates

The estimated costs for conduct of the monitoring tasks associated with streamflow and water-quality sampling, limnological sampling-pelagic zone, limnological sampling-littoral zone, and ecological health sampling are listed on the following page.

Streamflow and water-quality sampling: three riverine stations

(Coeur d'Alene River at Harrison, St. Joe River at mouth, Spokane River at lake outlet and Post Falls)

Construction and/or upgrades of gaging stations (one-time cost)	\$ 15K
Operation/maintenance of three gaging stations with real-time telemetry	\$ 40K
Collection of water-quality samples at three gaging stations	\$ 16K
Analytical services	\$ 10K
Project management and data evaluation	\$ 14K

Total annual cost, initial year **\$ 95K**

Total annual cost, following years **\$ 80K**

Limnological sampling, five pelagic stations

Collection of water-quality samples eight times yearly	\$ 91K
Analytical services	\$ 75K
Project management and data evaluation	\$ 20K

Total annual cost **\$ 186K**

Limnological sampling, twelve littoral stations

Collection of water-quality samples four times yearly	\$ 12K
Analytical services	\$ 24K
Project management and data evaluation	\$ 5K

Total annual cost **\$ 41K**

Ecological health sampling

Waterfowl health evaluation	\$ 45K
Fish health evaluation	\$ 30K
Bull trout health evaluation	\$ 25K
Analytical services	\$ 30K
Project management and data evaluation	\$ 15K

Total cost **\$ 145K**

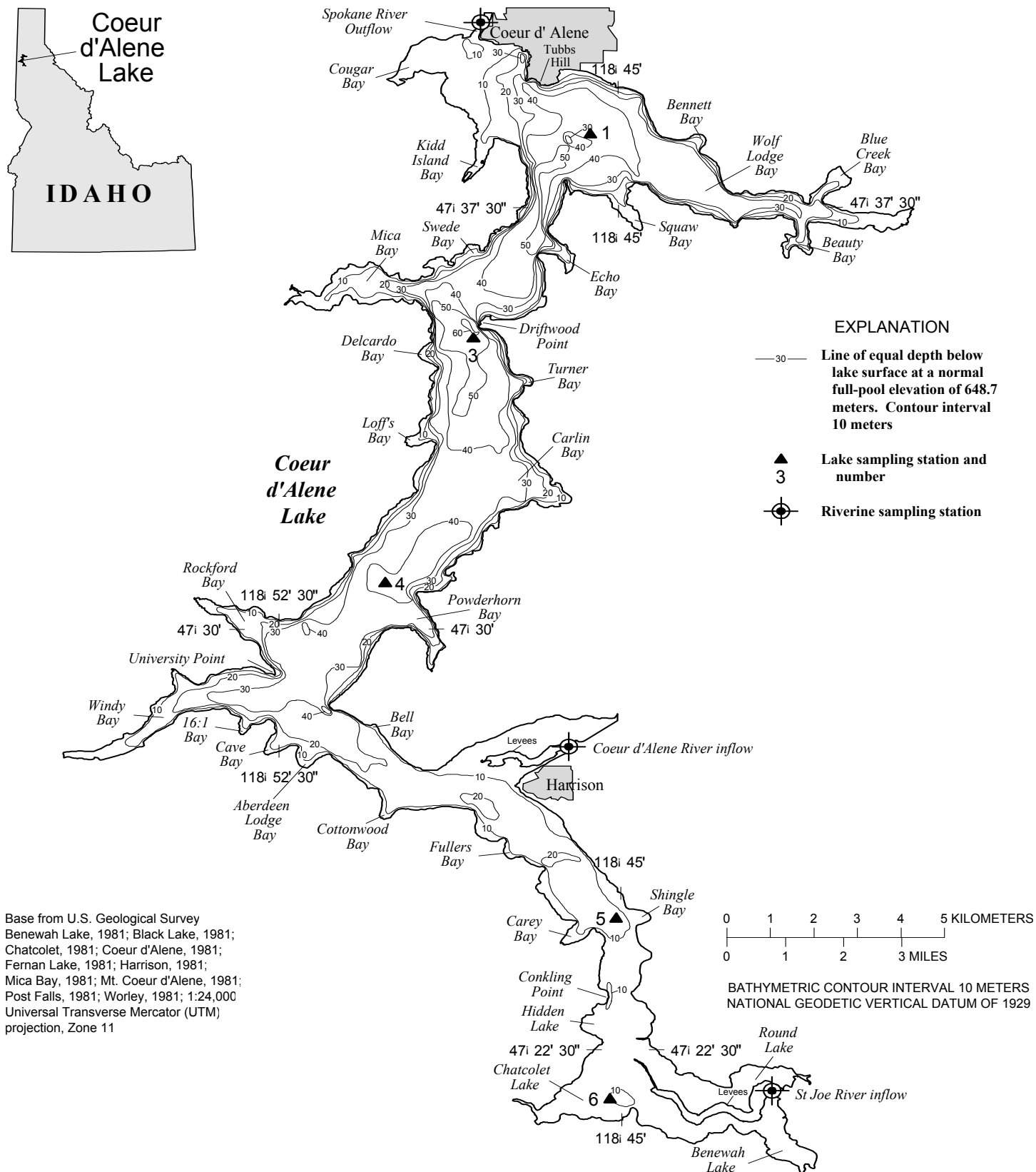
Table 1. Limnological basis for selection of sampling times at five sampling stations on Coeur d'Alene Lake

Month	Sample Collection? Y or N	Lake characteristics related to hydrodynamics, nutrients and productivity, fate and transport of trace elements
October	Y mid-month	Weakening stratification, drawdown cycle, declining productivity, maximum DO depletion, increased hypolimnion storage of trace elements
November	Y late month	Water-column circulation, stable pool, low productivity, DO replenishment, circulation of nutrients and trace elements
December	N	Similar to November, but cooler temperatures
January	Y late month	Inverse stratification, stable pool, low productivity, DO replenishment, circulation of nutrients and trace elements, follows several months of zinc-rich inflows from Coeur d'Alene River
February	N	Similar to January, but rain-on-snow events may have raised elevation and input nutrients and trace elements
March	N	Similar to February
April	Y mid-month	Pre-snowmelt runoff conditions, assess distribution of DO, nutrients, and trace elements at end of winter conditions
May	Y peak of runoff	Fill cycle from snowmelt runoff, early stratification, increasing productivity if not too turbid, assess distribution of DO, nutrients, and trace elements as affected by snowmelt runoff and water-column circulation
June	Y mid-month	Thermally stratified, stable summer pool, increasing productivity, start of DO depletion, increased stratification of nutrients and trace elements
July	Y mid-month	Similar to June, but stronger stratification and DO depletion
August	Y mid-month	Similar to July
September	N	Similar to August but start of drawdown cycle

Table 2: Proposed Environmental Monitoring Sampling Scheme for Coeur d'Alene Lake

Habitats	Proposed Station Locations	Proposed Measurement Parameters	Frequency of Sampling	Data Utility
Lacustrine – pelagic	SE of Tubbs Hill Driftwood Point University Point Conkling Point Chatcolet Lake	Full water column profile: Temp., pH, ox-redux, specific conductance, DO, turbidity, fluorescence. At multiple depths within water column: metals, total P and N, dissolved inorganic N, dissolved orthophosphate, chlorophyll-a and pheophytin. Sediment/water interface sampling: Gravity core for metals and nutrients.	Water column sampling eight times/year (See Table 1 for details) Sediment/water interface sampling eight times/year	<ul style="list-style-type: none"> - Mass balance of metals and nutrients - Fate and transport of metals - Nutrients and lake productivity - Benthic flux - Fish health
Lacustrine – littoral	Cougar Bay Kidd Island Bay Mica Bay Loffs Bay Rockford Bay Windy Bay Carey Bay Powderhorn Bay Carlin Bay Echo Bay Squaw Bay Beauty Bay	Water column sampling (one vertically composited sample): metals, total P and N, dissolved inorganic N, dissolved orthophosphate, chlorophyll-a and pheophytin, temp., pH, specific conductance, DO.	Four times/year <ul style="list-style-type: none"> - mid-October - late January - mid-April - mid-August 	<ul style="list-style-type: none"> - Fate and transport of metals - Nutrients and lake productivity - Fish, waterfowl, and wildlife health
Riverine	CDA River mouth St. Joe River mouth Spokane River at lake outlet	Temperature, specific conductance, turbidity, discharge flow rate, concentrations of metals, nutrients, and hardness	Continuous measurement using automated USGS gauging stations, periodic water-quality sampling	<ul style="list-style-type: none"> - Mass balance of metals and nutrients - Fate and transport of metals - Nutrients and lake productivity
Ecological - Palustrine, Lacustrine, and Riparian	To be determined	To be determined	To be determined	To assess health of waterfowl, fish and other wildlife in Lake

Note: The above sampling stations, sampled parameters, and frequency are proposed and subject to revision as the Basin-wide long-term status and trends monitoring program is developed.



SECTION 5: CONCLUSIONS AND RECOMMENDATIONS

Based on the review of the Plan, several key conclusions were made:

- General monitoring results indicate that water quality of the Lake remains good for nutrients, clarity and dissolved oxygen, however; 1) dissolved oxygen does not always meet State and Tribal standards in the southern 1/3 of the Lake, 2) dissolved zinc exceeds the State, Tribal, and federal standards by two fold, 3) lead concentrations have exceeded drinking water standards during extreme high flows, 4) Lake bed sediments pore water studies suggest that metals continue to flux into and out of solution within the sediment and in the water immediately overlying the sediment, and 5) zinc concentrations currently suppress algae production in the Lake.
- Stakeholders and agencies agree that further implementation of the Lake Plan is necessary.
- Many of the Action Items outlined in the old Plan have been implemented. Some actions were voluntary and not implemented. In addition, commenters believed a list which identifies specific restoration projects to reduce sediment should be developed. This list could be the basis for yearly prioritization and funding proposal development.
- There is no universal long-term priority to fund many Action Items.
- There is no organized coordination of the implementation of the Plan.
- There was no organized comprehensive lake water quality monitoring program in place to adequately track lake water quality trends.

Recommendations:

- Action Items outlined in the revised tables should continue to be implemented. This will entail having these Action Items considered a priority to land responsible managers.
- A new list must be developed to outline specific projects to implement that will reduce nutrients loads to the Lake's watershed.
- Funding must be identified to assure the restoration project list and action items identified in the tables of the Plan will be conducted.
- The monitoring Plan presented in this addendum should be funded for the life of the EPA clean up.
- A staff should be hired to oversee the implementation of the Plan.
- The Plan should be endorsed and adopted by the Basin Commission to be used in the development of the Basin-wide work Plan that will be implemented over the next 30 years. Yearly funding Proposals developed by the Commission should include LMP implementation.